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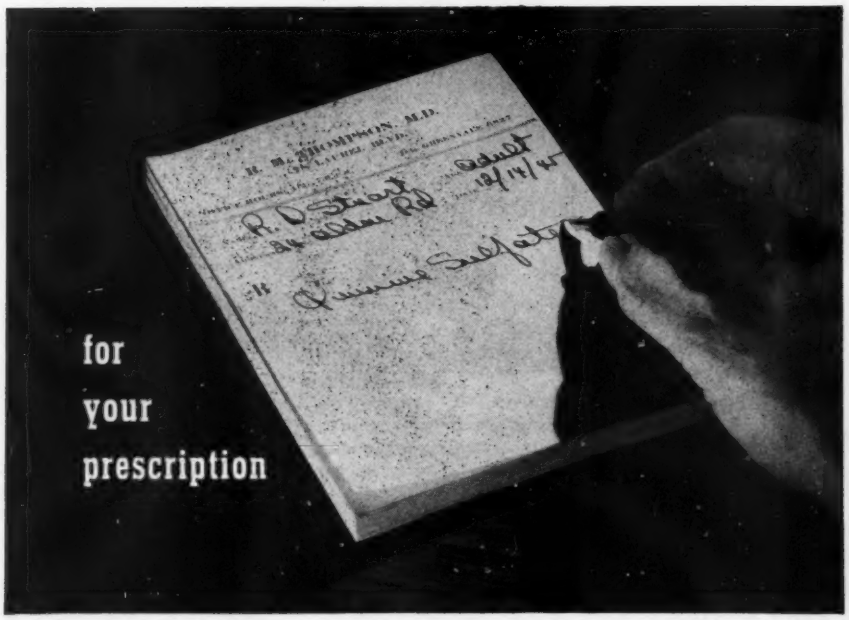

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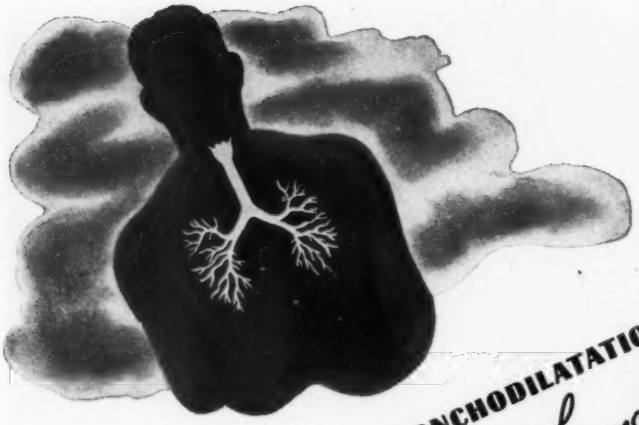

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1. Heller, C. G., and Myers, G. B.: J.A.M.A. **126**:472, 1944.

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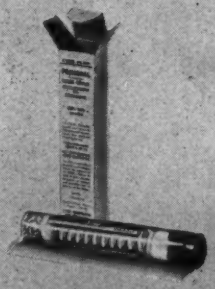

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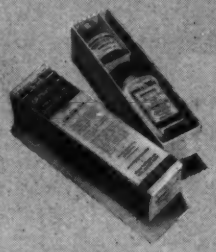

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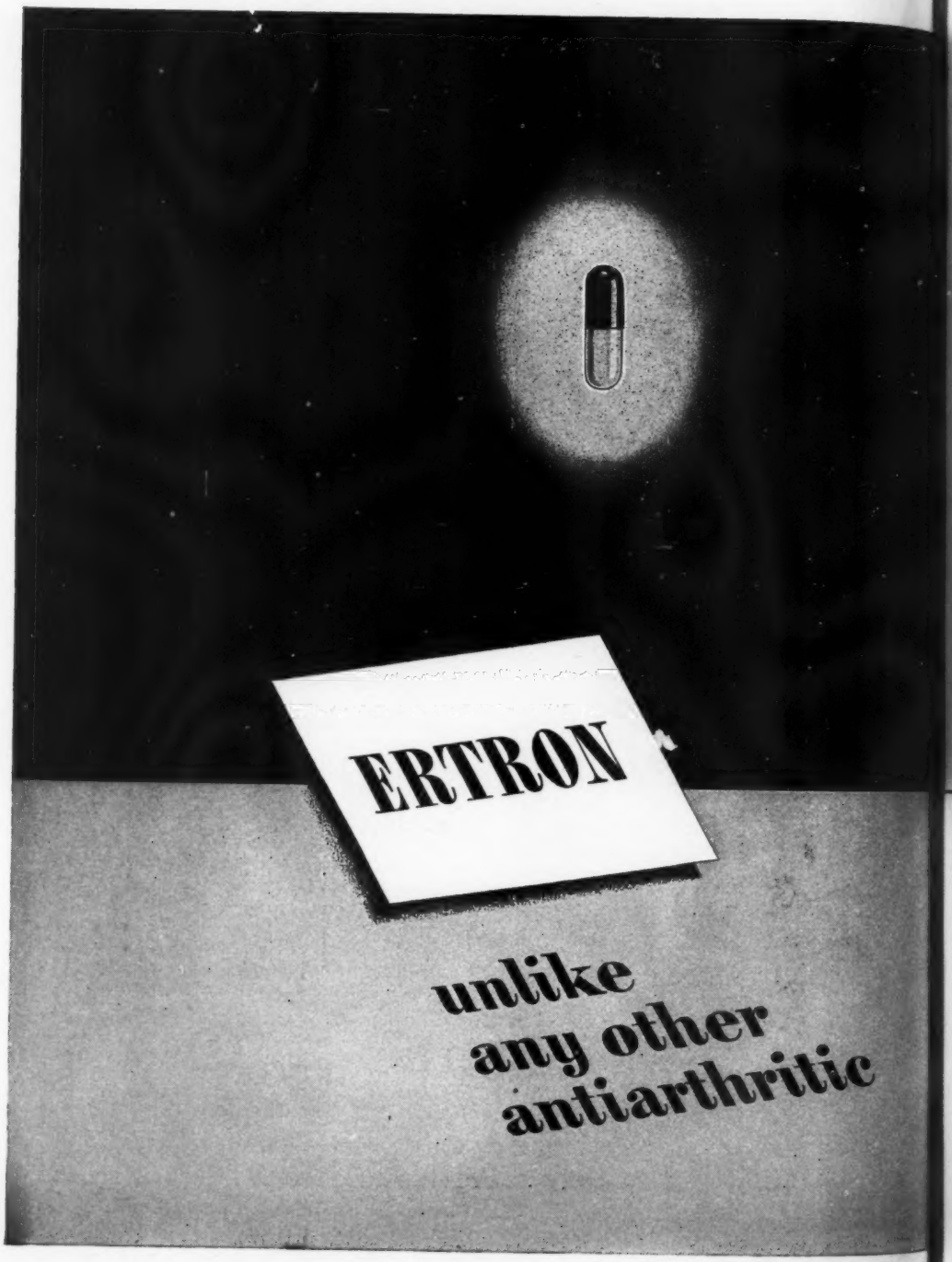
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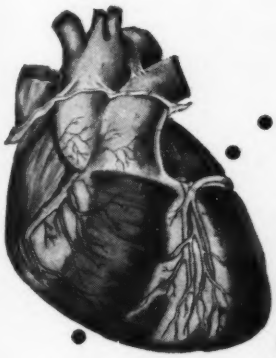

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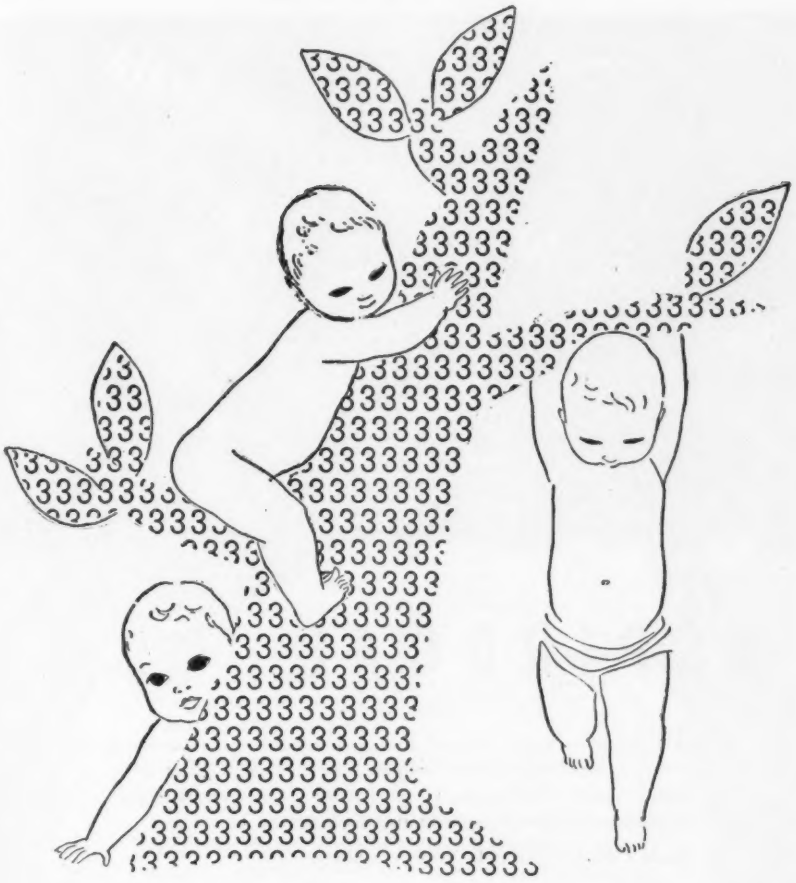
William R. WARNER and Co. Inc. 113 WEST 18TH STREET, NEW YORK 11, N. Y.

elixir
'omni-beta'
vitamin B complex

Supplied in cartoned, light-proof bottles of 4 and 8 fluidounces. Each carton includes a plastic, standardized U.S.P. teaspoon measure.

*Trademark Reg. U.S. Pat. Off.



babies grow on threes...

From infancy through late childhood, the average dose of Navitol with Viosterol is *only three drops daily*. This modern three-drop dose assures anti-rachitic protection for the normal child *throughout the active growth period.*

The maximum potencies of concentrated Oleovitamin A and D specified in U.S.P. XII —5,000 U.S.P. units of vitamin A and 1000 U.S.P. units of vitamin D—are supplied in three drops. So palatable, Navitol can be placed right on the baby's tongue, if desired. So nearly odorless, it is an instant hit with mothers. And economical! The three-drop dose costs only half a cent a day!

Navitol
TRADE MARK
WITH VIOSTEROL

SQUIBB

MANUFACTURING CHEMISTS TO THE MEDICAL PROFESSION SINCE 1858

ASPIROCAL

In the many gynecological and obstetrical conditions which require symptomatic relief of pain and reduction of nervousness and excitability, Aspirocal is the logical combination of analgesic-sedative-antispasmodic medication.

Each Tablet Aspirocal Comp. contains:

Acetylsalicylic Acid	**4 gr.**
Calcium Gluconate	**2 gr.**
Butisol (*5-ethyl-5-secondary butyl barbituric acid 'McNeil'*)	**1/3 gr.**

Butisol has a quick, long-continued sedative action with little tendency toward the familiar barbituric "hangover." In combination with acetylsalicylic acid and calcium gluconate, more effective analgesia is provided.

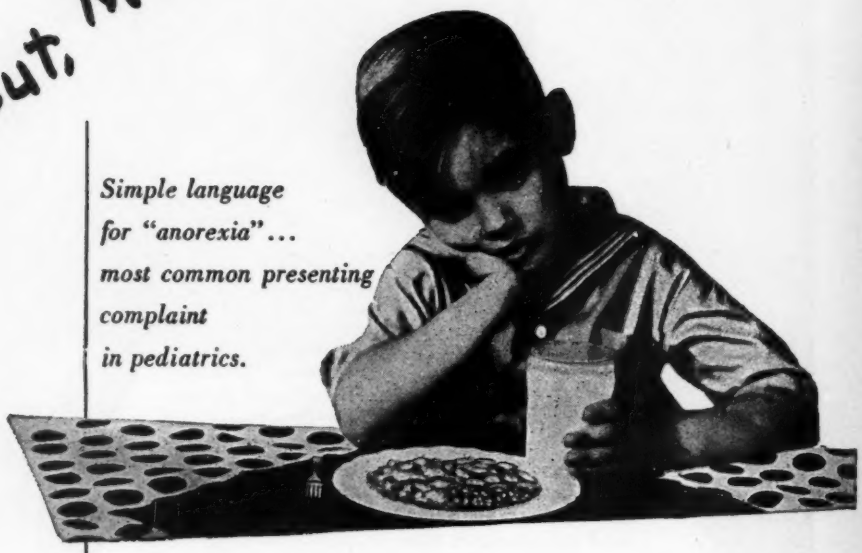
Aspirocal is indicated in dysmenorrhea, headache, neuralgia, etc.,—wherever sedation and analgesia are required. Supplied in bottles of 100, 500 and 1000 tablets. Caution: Use only as directed.

McNeil Laboratories
INCORPORATED
PHILADELPHIA • PENNSYLVANIA

Individualized Treatment
for the prophylaxis or therapeusis of
POLLEN ALLERGIES
★ Pitman-Moore pollen allergens are presented in specially designed individual treatment packages, which permit the dosage to be adjusted to individual sensitivity, a method definitely better than giving every patient the same dosage.
The permanency of these allergens is intensified by the use, in their production, of a special glycerosaline menstruum which insures full potency beyond the expiration date.
An Important Convenience Factor
When the case is of the typical seasonal type, with symptoms appearing annually shortly after the causative plants begin to bloom (grasses in the spring, ragweed in the fall) there is no necessity for making sensitization tests.
Pitman-Moore Allergenic Extract
GRASS POLLENS
(Mixed) (Bio. 102)
(With sterile diluent)
from the pollens of grasses responsible for most cases of the spring type of pollen allergy ("rose fever"): blue grass, timothy, sweet vernal, Johnson grass and red-top. (Each cc. of the concentrate contains 10,000 pollen units.)
ACCEPTED AMERICAN MEDICAL ASSN.
Pitman-Moore Allergenic Extract
RAGWEED POLLENS
(Mixed) (Bio. 101)
(With sterile diluent)
from pollens of Giant Ragweed 50% and Short Ragweed 50%. (Each cc. of the concentrate contains 10,000 pollen units.)
Write for
"A Simplification of the Physician's Problem in the Prevention and Treatment of Pollinosis."
PITMAN-MOORE COMPANY
PHARMACEUTICAL AND BIOLOGICAL CHEMISTS
Division of Allied Laboratories, Inc. · Indianapolis 6, Indiana

But, Mom, I'm not hungry!

Simple language for "anorexia"... most common presenting complaint in pediatrics.



A special preparation such as 'RYZAMIN-B' NO. 2 is needed to meet the distinctive requirements of children when a fortified, natural B complex is indicated. Tasty, honey-like, rich 'RYZAMIN-B' NO. 2 may be made into a delicious spread with jam or peanut butter, may be dissolved in milk, fruit juice, or other beverages, or given directly from its special measuring spoon. Children enjoy the delicious taste.

The potency and palatability of 'RYZAMIN-B' NO. 2, derived from natural sources as a concentrate of oryza sativa (American rice) polishings fortified with pure crystalline B vitamins, make it a preparation of choice for both young and old.

TUBES OF 2 OZ. AND BOTTLES OF 8 OZ. Three grams daily provide: Vitamin B_1, (Thiamine Hydrochloride) 3 mgm. (1,000 U.S.P. Units); Vitamin B_2 (Riboflavin) 2 mgm.; Nicotinamide 20 mgm. and other factors of the B complex... Gram measuring spoon with each packing.

'Ryzamin-B' registered trademark

'RYZAMIN-B' BRAND RICE POLISHINGS CONCENTRATE **No. 2**

with added thiamine hydrochloride, riboflavin, nicotinamide.

BURROUGHS WELLCOME & CO. (U.S.A.) INC., 9 & 11 EAST 41ST STREET, NEW YORK 17

BOTH THE PHYSICIAN
AND PATIENT APPRECIATE...

the unique combination of advantages in

- **PROMPT, EFFECTIVE ACTION**
  Disturbing urinary symptoms are usually alleviated within three to five days.
- **SAFETY**
  Virtual lack of toxicity facilitates therapy and eliminates need for selection of patients.
- **CONVENIENCE OF THERAPY**
  Supplementary acidification, restriction of fluid intake, dietary control, or other special measures are unnecessary.
- **WIDE RANGE OF THERAPEUTIC ACTIVITY**
  Remarkably efficient in the treatment of pyelonephritis, cystitis, prostatitis, and infections accompanying renal calculi or neurogenic bladder.

Mandelamine is supplied in enteric coated tablets of 0.25 Gm. (3¾ grains) each, in packages of 12 tablets sanitaped, and in bottles of 500 and 1000.

MANDELAMINE

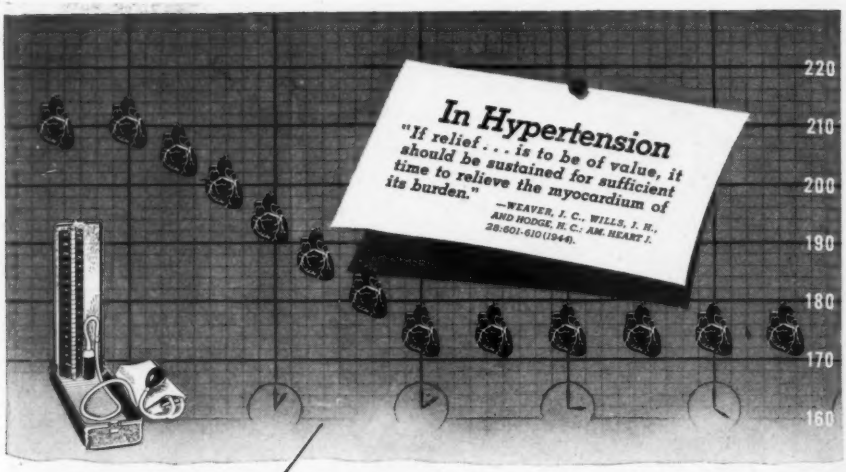
Reg. U. S. Pat. Off.
(Methenamine Mandelate)

NEPERA CHEMICAL CO. INC.
21 Gray Oaks Ave.
Yonkers 2, New York
Please send me literature, and a physician's sample of Mandelamine.

Name..... M.D.
Street.....
City..... State.....

NEPERA CHEMICAL CO. INC.

Manufacturing Chemists Yonkers 2, New York


In Hypertension
"If relief . . . is to be of value, it should be sustained for sufficient time to relieve the myocardium of its burden."
—WEAVER, J. C., WILLS, J. H., AND HODGE, H. C.: AM. HEART J. 28:601-610 (1944).
220
210
200
190
180
170
160

Maintaining lowered blood pressure over a more prolonged period...

NITRANITOL

BRAND OF MANNITOL HEXANITRATE

By its gradual, prolonged hypotensive action, Nitranitol relieves the myocardium of its burden, greatly lessens the danger of arterial damage and permits a resumption of regular activities.

There is no precipitate fall in blood pressure with Nitranitol, and its action is so prolonged as to permit maintenance of a continuous reduced pressure. Nitranitol can be used over extended periods of time without toxic manifestations; it does not produce nausea, and headache is rare.

Indications: Nitranitol is indicated in idiopathic arterial hypertension, for relief of such symptoms as headache, vertigo, palpitation, dyspnea, numbness, arrhythmia, etc., and for prevention of angina pectoris attacks, especially in patients suffering nocturnal seizures.

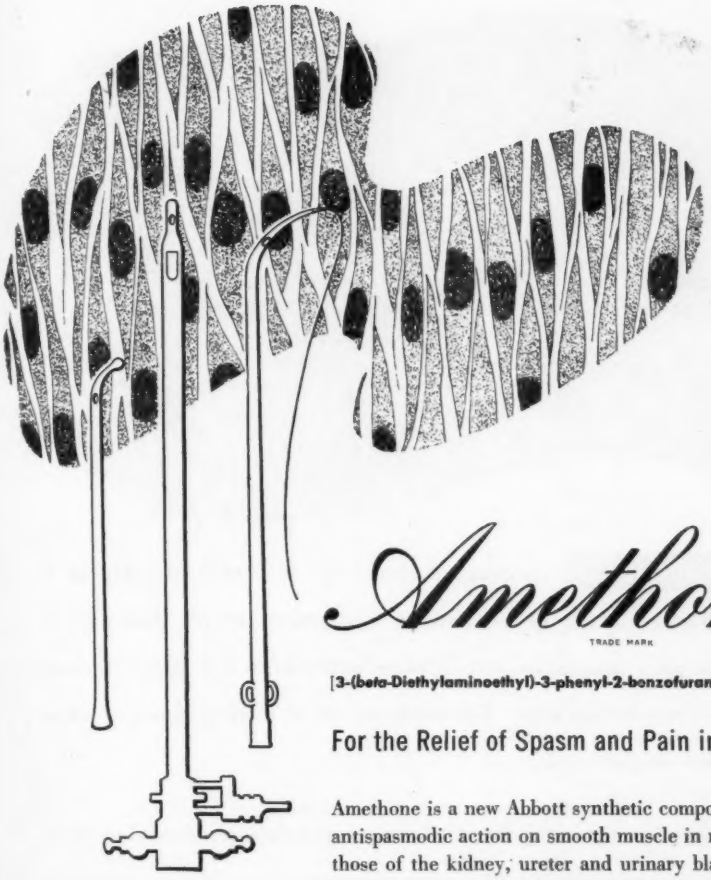
Average Dosage: One to two tablets every 4 to 6 hours. Nitranitol is available at prescription pharmacies in bottles of 100 and 1000 tablets. Each scored tablet contains ½ gr. mannitol hexanitrate.

Nitranitol with Phenobarbital For cases requiring sedation in addition to vasodilation, ½ gr. Nitranitol is combined with ¼ gr. phenobarbital. Supplied in bottles of 100 and 1000.

Trademark "Nitranitol" Reg. U. S. Pat. Off.

MERRELL

THE WM. S. MERRELL COMPANY · CINCINNATI, U. S. A.



Amethone

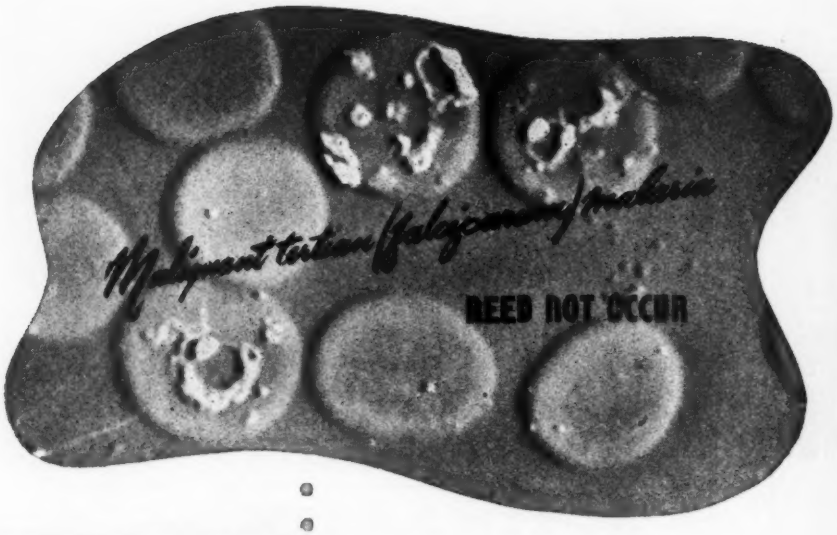
TRADE MARK

[3-(beta-Diethylaminoethyl)-3-phenyl-2-benzofuranone Hydrochloride, Abbott]

For the Relief of Spasm and Pain in the Urinary Tract

Amethone is a new Abbott synthetic compound that has a definite antispasmodic action on smooth muscle in many organs, especially those of the kidney, ureter and urinary bladder. ● Amethone has certain advantages over drugs formerly used to relieve spasm and pain in these structures, and is offered as a prophylactic and symptomatic treatment for ureteral spasm and colic and bladder spasm. Its stability in solution is in contrast to many other antispasmodic agents, thus lending itself better to the treatment of conditions in which an injectable solution is desired. It has low toxicity and fewer side-effects than the known synthetic antispasmodic agents. ● Amethone is indicated for the prophylaxis and treatment of colic caused by spasm of the smooth musculature of the renal pelvis, ureter and urinary bladder as a result of urolithiasis, instrumentation, retrograde pyelography, and indwelling catheters and packs. Amethone Capsules (50 mg.) are available in bottles of 25 and 100. Amethone Solution (100 mg. in 2-cc. ampoules) is available in boxes of 6 and 25 ampoules. Literature will be sent on request.

ABBOTT LABORATORIES, North Chicago, Illinois



ATABRINE DIHYDROCHLORIDE, the drug of choice for all types of malaria, is particularly effective in the prevention of malignant tertian (falciparum) malaria. It not only suppresses the clinical symptoms but actually cures this malignant form of malaria. The evidence of a similar curative effect of quinine is not conclusive.

Convincing evidence regarding the high relative safety of Atabrine dihydrochloride has been accumulated in the tremendous military experience of recent years. In fact, true toxicity of Atabrine dihydrochloride in man following recommended dosage over long periods of time has not been proved.

WINTHROP

ATABRINE DIHYDROCHLORIDE

"Atabrine," Trademark Reg. U. S. Pat. Off. & Canada

BRAND OF QUINACRINE HYDROCHLORIDE

SYNTHESIZED IN OUR LABORATORIES

Winthrop CHEMICAL COMPANY, INC.

Pharmaceuticals of merit for the physician • New York 13, N.Y. — Windsor, Ont.

when spasm means pain...

PAVATRINE with PHENOBARBITAL affords potent, swift, non-narcotic relief through relaxation of gastrointestinal smooth muscle.

The effectiveness of PAVATRINE as an antispasmodic has now been enhanced by the addition of phenobarbital to allay the central nervous symptoms that so often accompany spastic phenomena.

PAVATRINE with Phenobarbital

PAVATRINE (Searle) ..... 125 mg. (2 gr.)
(β-diethylaminoethyl fluorene-9-carboxylate hydrochloride)
PHENOBARBITAL ..... 15 mg. (¼ gr.)

—the new, synthetic antispasmodic which exerts both a local action on smooth muscle and a neurotropic effect on the nerve supply to the spastic muscle. Free from the toxic manifestations of the belladonna derivatives, PAVATRINE, in combination with phenobarbital, provides complete management for the distress of gastrointestinal, uterine and genito-urinary spasm.

Indicated for relief of:
Gastrointestinal spasm
Uterine spasm associated with dysmenorrhea
Urinary bladder spasm (as in cystitis, post-instrumentation spasm, etc.)

Pavatrine is the registered trademark of G. D. Searle & Co., Chicago 80, Illinois

SEARLE

RESEARCH IN THE SERVICE OF MEDICINE

Vitamin B's Independent Growth Factor

Growth is the most important word in the vocabulary of childhood; of major concern with the mother and physician. The feeding test is the only way to fully find it.

Practically all of the factors in a well balanced diet have to do with growth. Balanced proteins and minerals, carbohydrate and fat, with enough of the A, B, C, D Vitamin groups, and the whole of each group.

Outstandingly Vitamin B supplies one, and Vitamin A another, independent growth factor; inter-dependent and neither takes the place of the other.

Neither thiamin, riboflavin, nor niacin—so widely advertised as "the only recognized Vitamin B essentials"—singly, nor together, give, away from the other needed Vitamin B parts, either Vitamin B's independent growth or life-sustaining factors. (Photograph 1)

Dried Brewers Yeast does supply it; is the richest known source of Vitamin B's independent and indispensible growth factor. (Photograph 2)

1. Thiamin, riboflavin, and nicotinic acid, parts of Vitamin B, in otherwise complete diet.

2. Vitamin Food Company's Dried Brewers Yeast, sole source of Vitamin B, in otherwise complete diet.

VITAMIN REINFORCEMENT, SIMPLIFIED AND SURE

For vitamin reinforcement with babies, expectant and lactating mothers, and other adults, cod liver oil is the standard for Vitamins A and D, Dried Brewers Yeast for the whole of Vitamin B, and orange juice or its equivalent for Vitamin C.

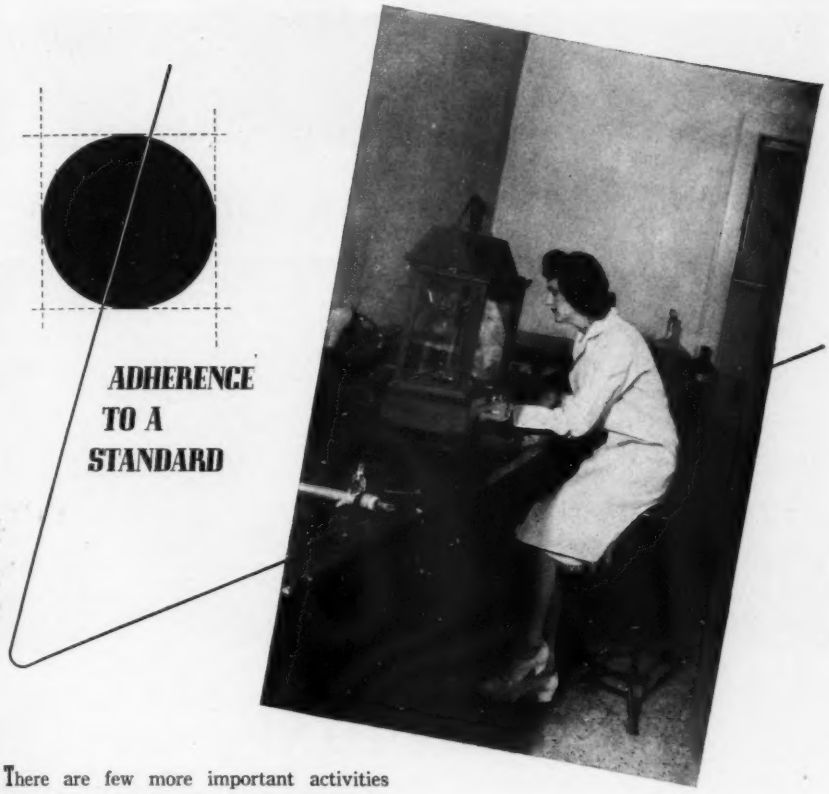
For Vitamin B, one-fourth teaspoon in bottle feeding;. one-half teaspoon for older children; two to three teaspoons for the nursing mother, have been indicated. Vitamin B well supplies and enough must be had of Vitamin B's independent lactation promoting factor for normal nursing. Use in milk, on cereals and in vegetables. For pellagra and other Vitamin B disorders two teaspoons three times a day (an ounce) up to two ounces, have been indicated.

Samples sent to physicians and hospitals

VITAMIN FOOD COMPANY, INC.

Vitamin Research Laboratories, Inc.

187 Sylvan Avenue **Newark 4, N. J.**



ADHERENCE TO A STANDARD

There are few more important activities than the production of medicaments for the relief of human ills—and none wherein the implications of responsibility are more profound.

Mass production on the grand scale is not necessarily an assurance of clinical efficacy. Doing a few things superlatively well provides products which merit deserved confidence.

Favored with an environment almost ideal for the important work being performed; guided by a staff of forward-thinking scientists; operated by personnel whose undiverted interest occupies each day, U. S. Standard Products Company are producing a selected and therapeutically efficient list of distinguished essentials for the medical profession.

OUTSTANDING U. S. STANDARD BIOLOGICALS:

DIPHTHERIA TOXOID

•

TETANUS ANTITOXIN

•

SMALL POX VACCINE

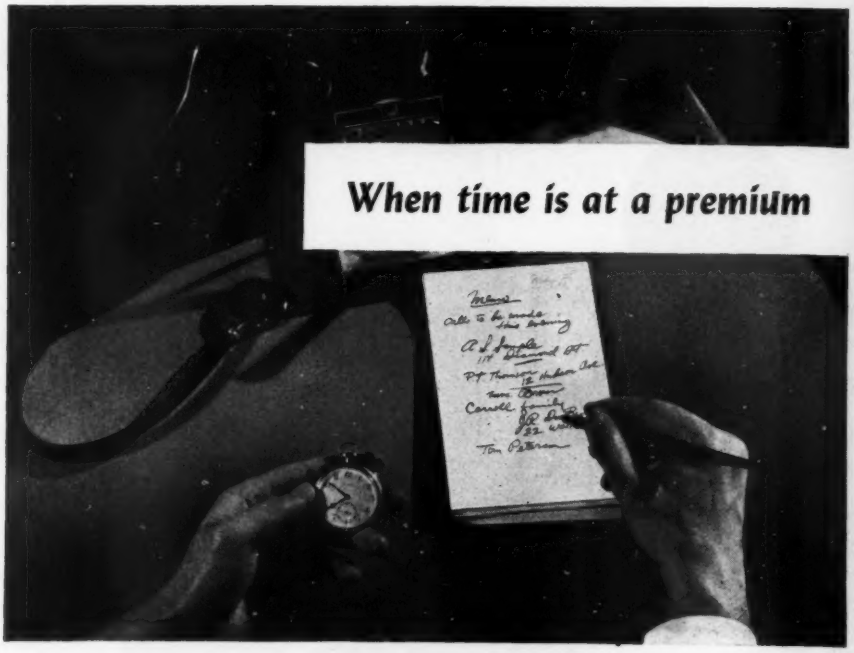
•

TYPHOID VACCINE

Also a representative list of glandular products and pharmaceuticals.

U. S. STANDARD PRODUCTS CO.

WOODWORTH, WISCONSIN, U. S. A.



PYRIDIUM

(REG. U. S. PAT. OFF.)

affords several distinct advantages

EASE AND CONVENIENCE OF ADMINISTRATION

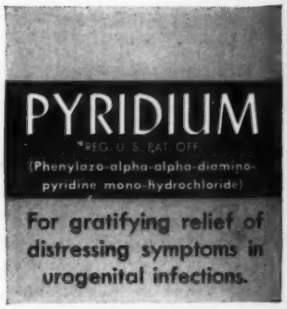
Pyridium is convenient to administer. No laboratory control, accessory medication, or other special measures are necessary for effective Pyridium therapy.

LACK OF TOXICITY

Therapeutic doses of Pyridium may be administered with complete safety throughout the course of cystitis, pyelonephritis, prostatitis, and urethritis.

RAPID RESPONSE

Prompt, *gratifying* relief of distressing urinary symptoms is the characteristic response to Pyridium therapy.


PYRIDIUM
*REG. U. S. PAT. OFF.
(Phenylazo-alpha-alpha-diamino-pyridine mono-hydrochloride)
For gratifying relief of distressing symptoms in urogenital infections.

MERCK & CO., Inc. *Manufacturing Chemists* RAHWAY, N. J.

COLOR PHOTOGRAPH BY KARL OESER

Good citizen

THESE are busy times for the man of medicine. Deployment of millions of men long in the public service, adjustment of countless dislocations emanating from the war, re-establishment of normal social and economic structures, all have their effect on the health of the people. Harassed by the demands of an avid public, the physician, in the interest of good citizenship if for no other reason, labors throughout the day and much of the night, longingly hoping for the day when the return of more of his colleagues to civilian practice will give him a small measure of relief.

Neither are these easy times for the manufacturer of drugs and medicines. Shortages of raw materials, readjustment from war to peace, new allocations of personnel, all have added to the burden. Perhaps it is all for the better. New responsibilities bring new opportunities for service, the most gratifying element of all business operations. Eli Lilly and Company, with the support and co-operation of the physicians and pharmacists whom it serves, will continue to make substantial contribution to medical care with particular emphasis on both fundamental and applied research.

A picture of The Good Samaritan provided the inspiration that

eventually led to the founding of Eli Lilly and Company

Barbiturate group

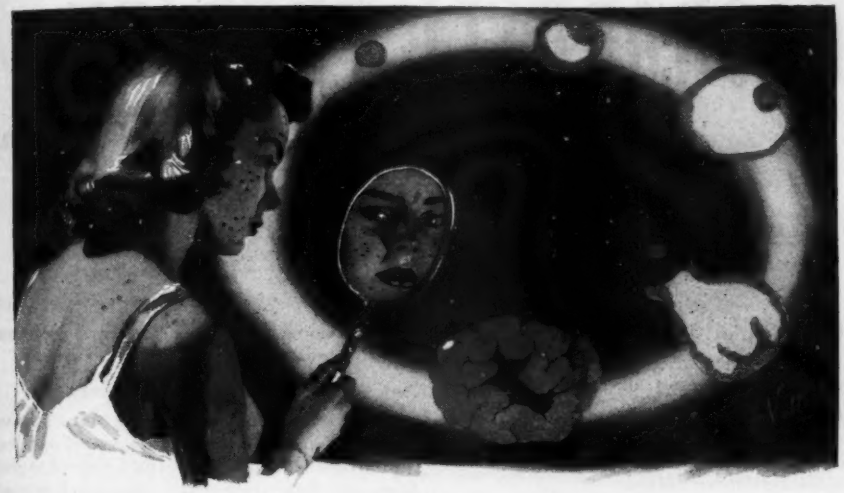
Through proper selection of the drug, dose, and route of administration, almost any degree of central nervous system depression, from light sedation to deep hypnosis, may be obtained with Lilly barbiturates. In order of increasing duration of action, Lilly barbiturates are listed as follows:

Short Acting . . . 'SECONAL SODIUM' (Sodium Propyl-methyl-carbinyl Allyl Barbiturate, Lilly)

Moderate Duration . . . 'SODIUM AMYTAL' (Sodium Iso-amyl Ethyl Barbiturate, Lilly)

Longer Acting . . . 'AMYTAL' (Iso-amyl Ethyl Barbituric Acid, Lilly)

ELI LILLY AND COMPANY, INDIANAPOLIS 6, INDIANA, U. S. A.



Periodic Acne!

The ovaries appear to have a definite but variable influence on the condition of the skin. The effect is upon the sebaceous glands, primarily, and a disturbance in this ovariandermal relationship seems to be responsible for the quite common "periodic acne". The skin eruption comes and goes with the menstrual cycle. Periodic headaches may be associated with the condition.

Ovarian Concentrate Armour has been found to be quite beneficial in this syndrome. This preparation is a special sterol fraction, free from demonstrable estrogenic properties, derived from the fat and lipoid fraction of whole ovaries by a special process originated in the Armour Laboratories. It is put up in sealed gelatin capsules (glanules). The recommended dose for periodic acne is one glanule t. i. d. for one month. After this, one glanule t. i. d. for seven to ten days premenstrually may suffice. They should be taken with meals.

ARMOUR
Ovarian Concentrate Glanules

Have confidence in the preparation you prescribe — specify "ARMOUR"

THE Armour LABORATORIES

HEADQUARTERS FOR MEDICINALS OF ANIMAL ORIGIN • CHICAGO 9, ILLINOIS

CHLOROPHYLL THERAPY

. . . The New Biologic Approach to Healing

CHLORESIUM [*natural, nontoxic chlorophyll preparations—unique in field*

In the healing of wounds, the water-soluble derivatives of chlorophyll provide the following unique and superior advantages:

1. *They are absolutely nontoxic.*
2. *They measurably hasten the healing process by accelerating normal tissue regeneration through stimulating cell metabolism.*
3. *They promptly deodorize foul-smelling wounds by inhibiting anaerobic bacterial growth.*

Exhaustive clinical investigation

The water-soluble derivatives of chlorophyll "a" have been extensively tested during the past four years in laboratory and clinic in the topical treatment of wounds, battle injuries, burns, ulcers and similar lesions, especially those of the chronic, indolent and resistant type.

Numerous investigators have demonstrated that these natural, nontoxic chlorophyll preparations produce definite measurable acceleration of healing and a reduction of scar tissue. In addition, they report prompt elimination of the almost unbearable odors found regularly in chronic suppurative lesions of bone and other tissues.

Now offered to the medical profession

The results of clinical investigations by more than five hundred physicians, associated with leading universities and hospitals, have proved so gratifying that these therapeutic chlorophyll preparations are now offered to the medical profession by the Rystan Company under the name *Chloresium.*

Both Chloresium Solution (Plain) and Chloresium Ointment contain the purified, therapeutically active water-soluble derivatives of chlorophyll "a" ($C_{55}H_{72}O_5N_4Mg$). They are maintained to rigid chemical and physical standards and are pharmaceutically adjusted to a low surface tension to insure penetrability.

The topical use of Chloresium Solution (Plain) and Chloresium Ointment is indicated in a wide range of acute and chronic lesions, especially in the treatment of wounds, burns, ulcers, skin diseases, and malodorous lesions.

Chloresium
REG. U.S. PAT. OFF.

Chloresium is ethically promoted. Available at all leading druggists.

CHLORESIUM SOLUTION (PLAIN) 2 oz. and 8 oz. bottles

CHLORESIUM OINTMENT 1 oz. tubes and 4 oz. jars

CHLORESIUM NASAL SOLUTION*. ½ oz. dropper bottles and 2 oz. and 8 oz. bottles

*Chloresium Nasal Solution contains the purified, therapeutically active water-soluble derivatives of chlorophyll "a" ($C_{55}H_{72}O_5N_4Mg$) in an isotonic saline solution suitably buffered for nasal instillation. Indicated for symptomatic relief and for acceleration of healing of acute and chronic inflammatory conditions of the upper respiratory tract.

RYSTAN COMPANY, Dept. SM-2
50 Church St., New York 7, N. Y.

Please send me, without obligation, "Chlorophyll—Its Use In Medicine," a review of over 60 published papers, with explicit directions for the use of Chloresium therapy —and clinical samples of the products indicated:

( ) Chloresium Solution (Plain); ( ) Chloresium Ointment; ( ) Chloresium Nasal Solution.

*Name*_____ *M. D.*

*Street*_____

*City*_____ *State*_____

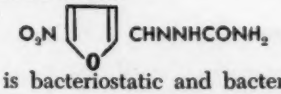
RYSTAN COMPANY
50 CHURCH STREET, NEW YORK 7, N.Y.

SOLE LICENSEE—LAKELAND FOUNDATION

Announcing

a New Chemotherapeutic Agent

The nitrofurans, a new class of antibacterials, are a recent discovery of Eaton Laboratories[1]. One, especially, is highly effective. This has been named *Furacin.*



Furacin is bacteriostatic and bactericidal to many *gram-positive* and *gram-negative* bacteria, and remains effective in the presence of body fluids. It is stable and low in toxicity.

First Available in FURACIN SOLUBLE DRESSING

Dissolved in a bland, water-soluble base, Furacin is first presented in Furacin Soluble Dressing, for topical treatment of wound and surface infections. This preparation liquefies at body temperature and is soluble in blood, pus and serum, which aids penetration to all parts of wounds. It is non-irritating, has a low index of sensitization and does not interfere with healing processes.

The outstanding results of clinical trials in both military[2] and civilian[3] practice indicate that it possesses important advantages in comparison with sulfonamides and penicillin used topically.

Indications:

Infected surface wounds, or for the prevention of such infection—infections of third and fourth degree burns—carbuncles and abscesses after surgical intervention—infected varicose ulcers—superficial ulcers of diabetics—secondary infections of eczemas—impetigo of infants and adults—treatment of graft sites preparatory to skin grafting, and later, to prevent infection—osteomyelitis associated with compound fractures—secondary infections of dermatophytoses.

EATON LABORATORIES Inc NORWICH NEW YORK

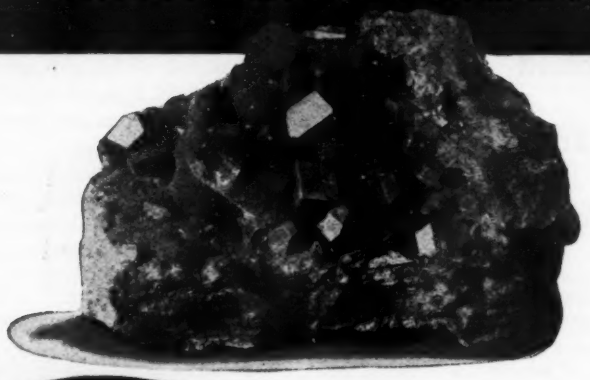
1. Dodd, M. C. and Stillman, W. B., J. Pharmacol. & Exper. Therap. *82*:11, 1944.
2. Snyder, M. L., Kiehn, C. L., Christopherson, J. W., Military Surgeon *97*:380, 1945.
3. To be published.

For literature on Furacin Soluble Dressing, write *The Medical Director, Eaton Laboratories, Inc., Norwich, N. Y.*

HYDROSULPHOSOL

Provides all 9 desired requisites as a superior therapy in thermal, acid and caustic burns.

Provides for mechanical exclusion of air at site of burn • Insures prompt relief of pain • Aids in abating burn shock • Bacteriostatic influence • Non-toxic effect • STIMULATES TISSUE REPAIR • Rapidly reduces inflammation and edema • Results in absence or marked reduction of scar tissue • Tends to shorten convalescent period.



AVAILABLE FORMS

AQUEOUS SOLUTION:
Bottles of 8, 4 and 1 fluid ounce.

OINTMENT:
Jars of 1 lb. and 1 oz.

ORDER TODAY through your surgical or hospital supplier.

HYDROSULPHOSOL is a true solution of sulfur bearing compounds resulting solely from the reduction of flowers of sulfur by a catalytic process. In aqueous solution, it is capable of rapidly releasing its high concentration of sulfhydryl ion (-SH radical) in such form as can be effectively utilized by the body in the synthesis of sulfur-containing amino acids . . . functionally active in cell stimulation and directly related to tissue respiration and repair.

Unlike the sulfa group and many other sulfur compounds, Hydrosulphosol is non-toxic when administered orally or topically applied in heavy concentrations, and will not result in damage to liver and kidney function.

Reprints of scientific papers by authoritative investigators available on request.

Distributed by
REES-DAVIS DRUGS, INC.
MERIDEN CONNECTICUT

SPECIFY WITH CONFIDENCE...

Penicillin Troches Schenley—1,000 units each. Supplied in bottles of 25.

PENICILLIN TROCHES SCHENLEY With a base which dissolves slowly, and thus gradually liberates penicillin at the site of infection, these troches provide an effective means for treatment of mouth and throat infections due to Vincent's organisms. Penicillin Troches Schenley retain potency over long periods when kept at recommended temperature.

Penicillin Tablets Schenley—25,000 units each. Supplied in bottles of 20.

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1. Comroe, B. I.: Arthritis and Allied Conditions, Philadelphia, Lea & Febiger, 1944, p. 419.

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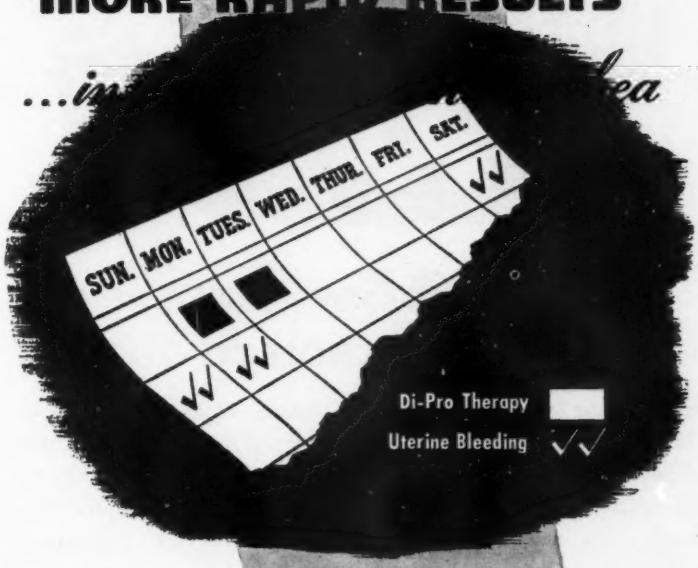

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*S. C. Freed, *West. J. Surg.*, 54:1, 1946

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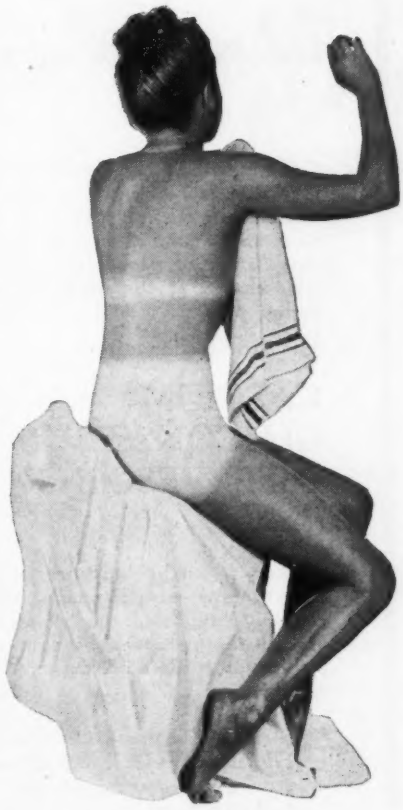

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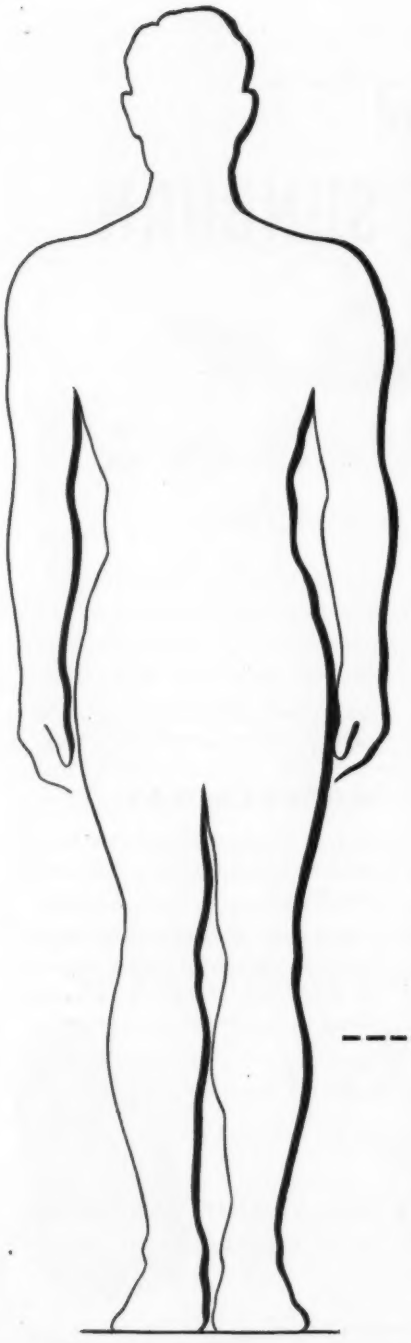

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Rambar, A. C., Hardy, L. M., Fishbein, W. I.: J. Ped. 23:31-38 (July) 1943
Wolf, I. J.: J. Ped., 22:707-718 (June) 1943
Wolf, I. J.: J. Ped., 22:396-417 (April) 1943
Wolf, I. J.: J. Med. Soc. New Jersey, 38:436 (Sept.) 1941

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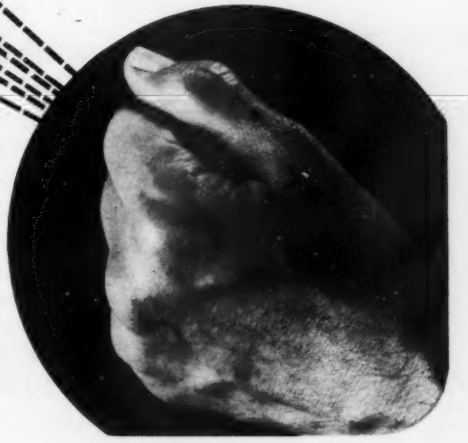

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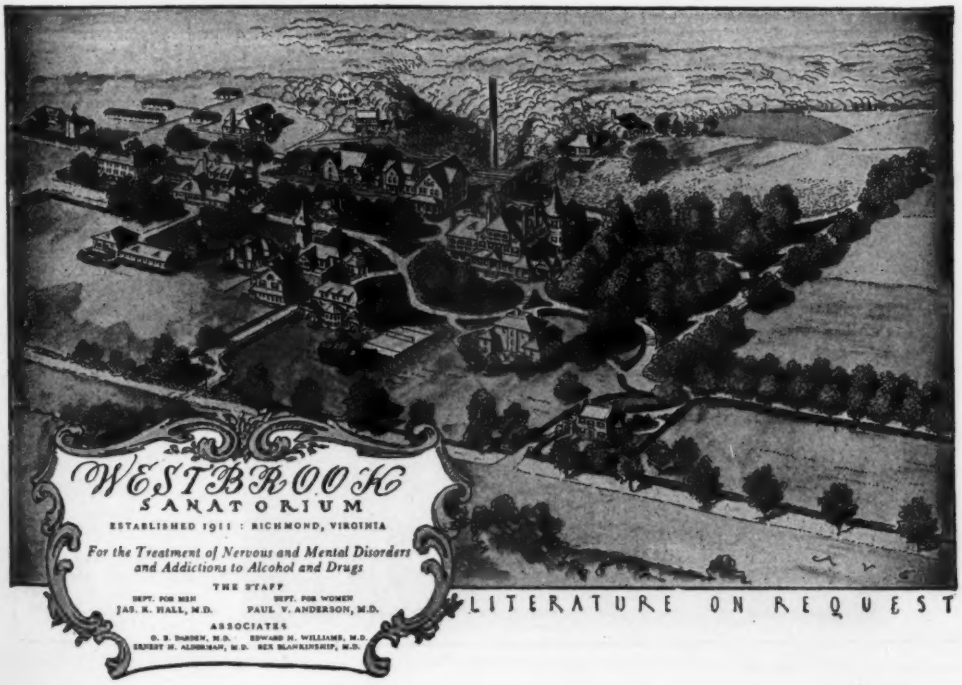
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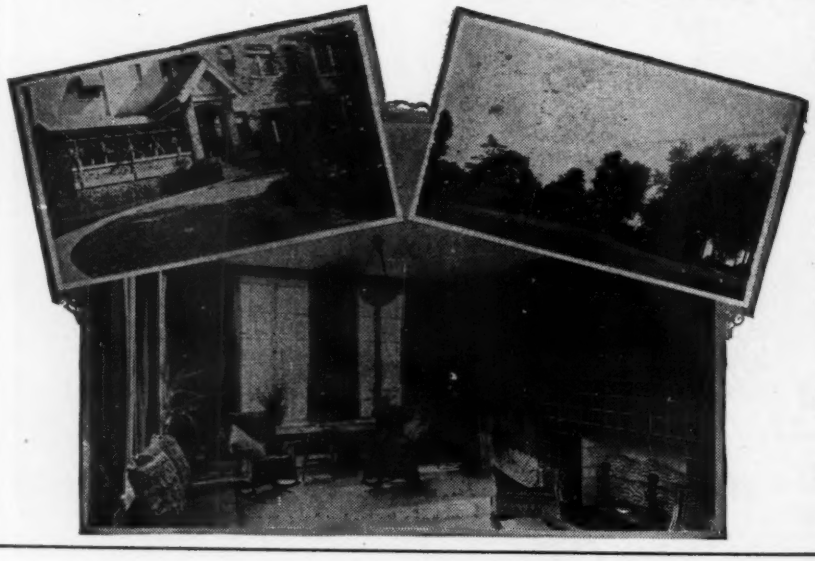

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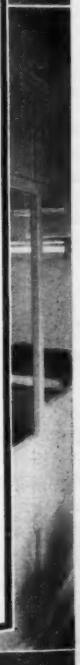

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Volume 39 MAY 1946 Number 5

CARDIAC PROBLEMS IN A GENERAL HOSPITAL OVERSEAS*

By JOSEPH C. EDWARDS, M.D.†
St. Louis, Missouri

It was interesting to note that in general, aside from a few cases of purulent pericarditis with bullet wounds in or near the heart, and a greater number of patients with anxiety symptoms referable to the heart, the distribution of cardiovascular diagnoses was much the same in a general hospital almost three years overseas as in a large army general hospital in the United States.

During the first one and one-half year's duty in Africa and Italy, the Twenty-First General Hospital had a total of 570 electrocardiograms taken on 489 patients. There were 29,165 hospital admissions in the same period and nearly 65,000 admissions in not quite three years overseas service in Africa, Italy and France. Roughly 30 to 40 per cent were medical.

Ninety-eight (20 per cent) of the 489 patients had abnormal electrocardiograms, or 0.34 per cent of total admissions and about 0.8 per cent of the admissions to the medical service. The number of officers and enlisted men in the various age groups is shown in *Table 1.*

At the Percy Jones General Hospital and Annex, Battle Creek, Michigan, where I was stationed the last two months of my active duty, there were 100 patients with abnormal electrocardiograms among the 1,403 patients on whom they were taken during the first nine months of 1945. Over 5,206 patients were admitted to the medical service there during that time, and over 7,000 on the surgical service. Thus about 2 per cent of the medical admissions and 0.8 per cent of the total admissions at Percy Jones General Hospital had abnormal electrocardiograms in that period.

There were 9 cases of myocardial infarction seen in one and one-half years service of the Twenty-First General Hospital in Africa and Italy, and 6 cases were admitted to Percy Jones General Hospital in the first 9 months of 1945. The following data apply only to patients at the former hospital.

Seventeen of the 98 with abnormal electrocardiograms at the Twenty-First General Hospital were officers:

P-R Interval.—One aged 27 had a P-R interval 0.24 seconds after an attack of auricular fibrillation had been restored to normal rhythm by quinidine and digitalis. There was no history of rheumatic fever. Two had absent R waves with anterior myocardial infarctions.

Axis Deviation.—Seven had left axis deviation and two had right axis deviation.

T Waves.—Nine had T wave changes from inversion to isoelectric or diphasic types.

Extrasystoles.—Two had auricular extrasystoles; two had ventricular extrasystoles persisting after exercise.

Auricular Fibrillation.—Three had auricular fibrillation (*Table 4*).

Eighty-one of the enlisted men had abnormal electrocardiograms (*Tables 1* and *3*) (21st General Hospital):

---

*Read in Section on Medicine, Southern Medical Association, Thirty-Ninth Annual Meeting, Cincinnati, Ohio, November 12-15, 1945.

*Opinions expressed herein are those of the author only and do not represent official views of the Medical Department of the U. S. Army. Passed for publication on security grounds by the Office of the Surgeon General.

†Lieutenant Colonel, Medical Corps, AUS, Percy Jones General Hospital, Battle Creek, Michigan. On terminal leave.

P-R Interval.—Sixteen had a P-R interval over 0.2 seconds; four were 0.24 seconds. One with high agglutinins for the typhoid-paratyphoid group developed second degree block. Five of the above had rheumatic fever.

Axis Deviation.—Fourteen had left axis deviation and five had right axis deviation.

QRS.—Four had QRS of 0.12 seconds, one had left bundle branch block with 0.14 seconds QRS.

T Waves.—Forty-seven had T wave changes from isoelectric to inverted T waves in various leads. Eleven inverted in lead III only, were not considered abnormal.

P Waves.—There was one instance of ectopic origin of the auricular impulse; one of paroxysmal nodal tachycardia; and two of paroxysmal auricular tachycardia.

ORGANIC HEART DISEASE

During the first year and one-half, thirty-three patients with organic valvular lesions were seen. Most of these were returned to the zone of interior because of the hazards of exposure and exertion in a foreign theatre of operations. Thirty-one had essentially normal electrocardiograms. One had left axis deviation with low and inverted T waves; the other had right axis deviation. All patients were instructed to take a deep

391 NORMAL ELECTROCARDIOGRAMS

	Age not Given	20-29	30-39	40-49	50	Total
Officers	9	9	32	20	6	76
Enlisted men	29	185	90	5	6	315
						391

98 ABNORMAL ELECTROCARDIOGRAMS

	Age not Given	20-29	30-39	40-49	50	Total
Officers	1	4	5	5	2	17
Enlisted men	9	33	24	8	7	81
						98
						489

Table 1

HISTORY AND SYMPTOMS

	TOTAL 76	Officers' Normal ECG. 17	Officers' Abn. ECG. 315	E.M. Normal ECG. 81	E.M. Abn. ECG.
Precordial pain on exertion	53	8	1	37	7
Dyspnea	24	6	3	7	8
Precordial pain and dyspnea	73	13	2	41	17
Past history of auricular fibrillation	1	1	0	0	0
Past history of paroxysmal tachycardia	7	2	0	5	0
Past history of rheumatic fever	3	2	1	0	0
Past history of taking digitalis	6	0	0	0	6
Angina pectoris, suspect	2	0	0	2	0

Table 2

MEDICAL DIAGNOSIS

	TOTAL 76	Officers' Normal ECG. 17	Officers' Abn. ECG. 315	E.M. Normal ECG. 81	E.M. Abn. ECG.
Arterial hypertension, essential	17	7	3	7	0
Arterial hypertension, mild fluctuating	18	0	0	18	0
Psychoneurosis, anxiety neurosis, w/ N.C.A.	30	5	0	25	0
Neurocirculatory asthenia with no anxiety	2	0	0	2	0
Extrasystoles, persistent after exercise	4	2	2	0	0
Arteriosclerotic heart disease	2	1	1	0	0
Arteriosclerotic heart disease w/decompensation	1	0	1	0	0
Calcified aorta (x-ray) w/aortic insufficiency and syphilis	1	0	0	0	1
Angina pectoris	6	2	0	2	2
Acute rheumatic fever	25	0	0	20	5
Rheumatic heart disease (no valve lesion yet)	2	2	0	0	0
Valvular heart disease	33	0	0	31	2
Non-cardiac edema	7	0	0	7	0
Acute pericarditis	3	0	0	0	3
Acute cor pulmonale	1	0	0	0	1
Congenital heart disease	5	0	0	5	0
Patent ductus arteriosus	1	0	0	1	0
Coarctation of aorta	1	0	0	1	0
Auricular septal defect	1	0	0	1	0
Inter-ventricular septal defect	2	0	0	2	0

Table 3

breath during the latter part of lead III in order to exclude the effect of high diaphragm and rotation of the heart on its electrical axis which might be confused with axis deviation due to enlargement of the heart.

ECG. DIAGNOSES

	TOTAL 76	Officers' Normal ECG. 17	Officers' Abn. ECG. 315	E.M. Normal ECG. 81	E.M. Abn. ECG.
Sinus tachycardia	22	0	0	10	12
Paroxysmal auricular tachycardia	2	0	0	0	2
Extrasystoles, ventricular	23	2	0	14	7
Extrasystoles, nodal	1	0	0	0	1
Extrasystoles, auricular	2	0	2	0	0
Auricular fibrillation	3	0	3	0	0
Bigeminy	1	0	0	0	1
Coronary artery disease	2	0	2	0	0
Myocardial infarction, recent	9	0	3	0	6
Old	1	0	0	0	1
Myocardial damage	4	0	0	0	4
Left axis deviation	32	0	7	0	25
Right axis deviation	9	0	2	0	7
A-V conduction defects	17	0	1	0	16
Left bundle branch block	1	0	0	0	1
I-V conduction delay	4	0	0	0	4

Table 4

There were twenty-five patients with acute rheumatic fever, five of which had delayed A-V conduction time.

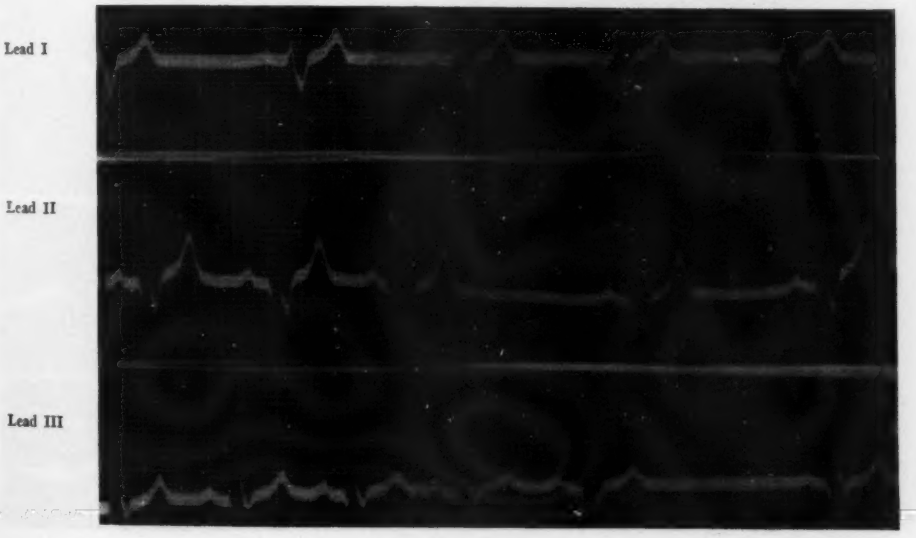
During the first year and one-half overseas, nine patients had a definite diagnosis of myocardial infarction due to coronary thrombosis. Four were of the posterior type and five were anterior type. Five of these were under 30 years of age. All had changes in several tracings.

No significant changes were found in electrocardiograms of patients with amebiasis who received a total of 6 to 9 grains of emetine in doses of 1 grain per day. There have been previous reports of abnormal electrocardiograms of patients who received larger total doses. Sinus tachycardia existed for over two weeks in one patient.

There were five patients with auricular fibrillation and six with paroxysmal auricular tachycardia, two of which were observed by us during attacks. One patient had paroxysmal nodal tachycardia (*Table 4* contains number recorded by ECG).

CARDIAC ENLARGEMENT

In some instances the electrocardiogram reveals changes in axis deviation before the x-ray shows enlargement. Some patients with marked enlargement of both ventricles may not show axis



Case 1, Fig. 1, L. S.

deviation. The variations in heart size on roentgenograms may be caused by change in distance of patient from the tube, and change in phases of respiration and cardiac cycle at the time an exposure is made.

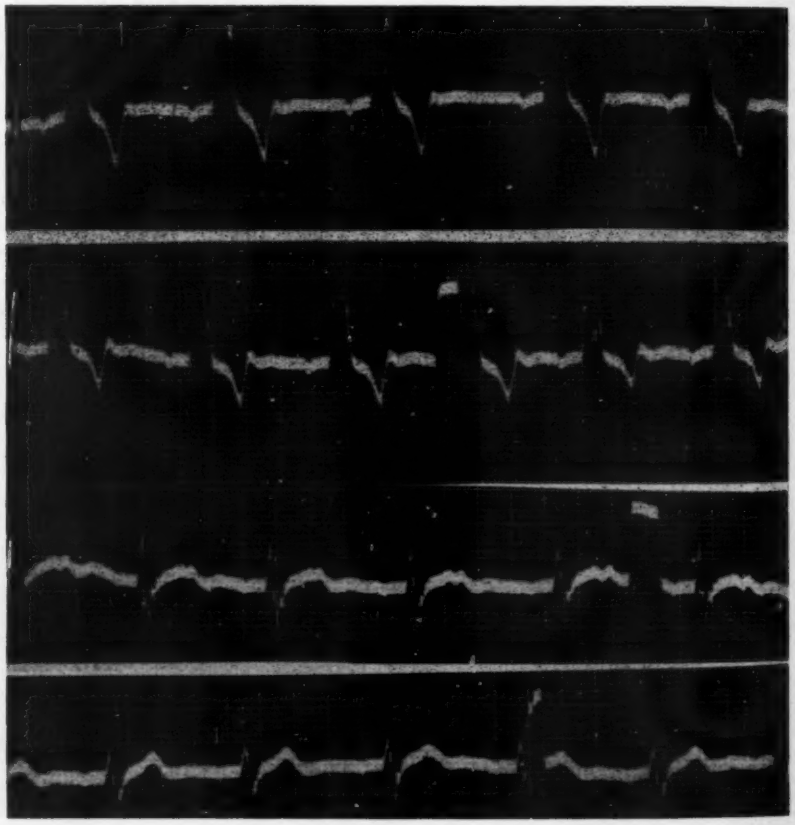
HYPERTENSION

There were seventeen patients with a definite essential hypertension, blood pressures ranging from 170/110 to 180/118. Two patients had an elevation of systolic pressure which was persistent. Eighteen had a mild systolic elevation for a few days, but it varied and was related to nervous tension and anxiety rather than any fundamental alteration of the cardiovascular system.

It should be emphasized that a diagnosis of hypertension should not be made on the basis of one or two recordings. Blood pressures taken at basal conditions before arising in the morning and after a period of activity in the afternoon for three days will enable one to get a more accurate record of blood pressure. Pressures taken hourly for 6 hours after sedation with 0.09 to 0.18 grams of phenobarbital or sodium amytal are of value too. The careful examination of the urine and renal function with evaluation of retinal vessel changes is important when hypertension exists.

ANXIETY STATES AND CARDIAC SYMPTOMS

In 1,000 consecutive patients on the neuropsychiatric service studied by Major Bernard L. Greene, 453 were given a diagnosis of psychoneurosis, anxiety neurosis. One hundred six of these had the main complaints referable to the



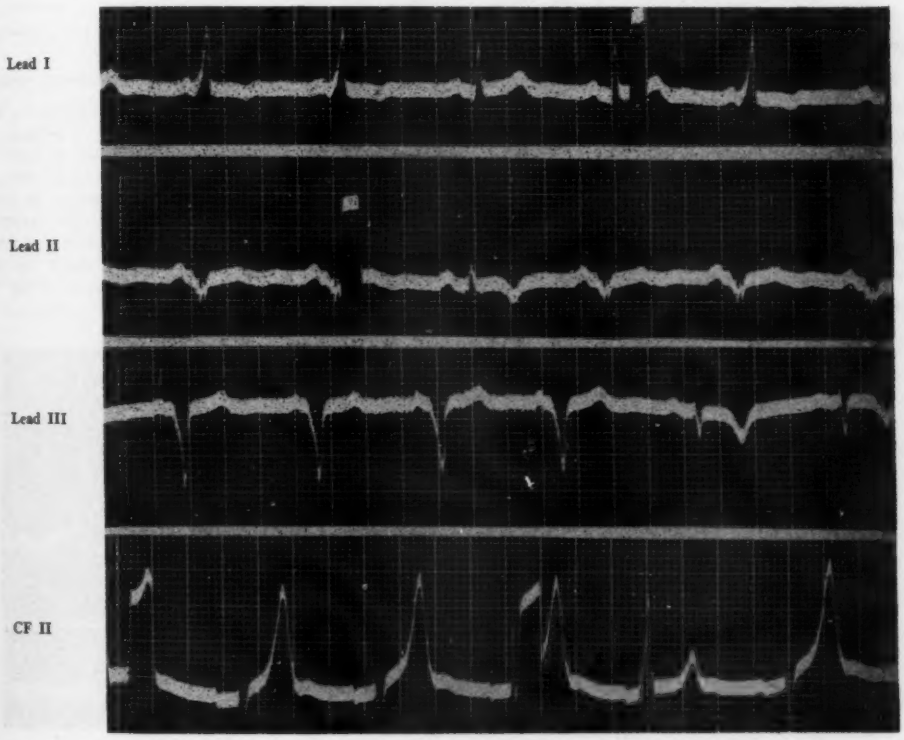
Case 1, Fig. 2, L. S.

heart, 88 to the gastro-intestinal system, and 12 had symptoms referable to both. Only 19 had the precordial aches or pains on exertion, with palpitation, undue fatigue and shortness of breath after exertion, that go to make up the syndrome of neurocirculatory asthenia. Many had a low blood pressure with unstable vasomotor system manifested by profuse sweating and tachycardia. It is difficult to separate those with the above symptoms due to nervous tension and fatigue, such as may occur in prolonged service away from home in or out of combat, and those few who are endowed with a small aorta or other deficiency of the cardiovascular and/or muscular system, that prohibits them from doing more than a certain amount of continuous exertion. Those in whom it occurs after severe emotional and physical stress, labelled as combat fatigue or exhaustion, recover with rest, relaxation and a period of rehabilitation.

Somewhat over half of those patients described above were returned to limited duty and somewhat less than half, by actual statistics, were sent to the United States. Two were returned to full duty. A greater per cent of those seen in forward hospitals were returned to duty, but the rest were sent back to general hospitals.

Many of the milder anxiety states with either or both cardiovascular and gastro-intestinal symptoms were seen only in consultation by the psychiatrist and were treated and returned to full or limited duty by the internist.

Thirty of the patients with symptoms referable to the heart associated with an anxiety state had electrocardiograms taken and all were normal. It was not necessary to take an electrocardiogram on every patient with such complaints. Some had a simple apprehension or cardiac neurosis which could be relieved by a thorough examination followed by positive reassurance.



Case 4, Fig. 3, N. A.

It is necessary, however, in civilian or army life, to examine carefully the patients with anxiety and symptoms referable to the heart in order not to miss the few who have in addition to the anxiety some organic heart disease (*Table 2*). One patient had old rheumatic mitral valvular disease in addition to anxiety. Another was nervous, tense and came as an ambulatory patient to the hospital, but careful history and examination brought out the possibility of organic heart disease. A diagnosis of posterior myocardial infarction was made with the aid of the electrocardiograph, with changes on successive days.

In connection with the above, it is important properly to evaluate functional murmurs, especially in those with symptoms not too unlike those in organic heart disease. Complete cardiovascular studies may be necessary in some of these cases.

CONCLUSION

A relatively high number of men under the age of 30 had myocardial infarctions.

A more careful screening of those with heart disease and those with neuropsychiatric tendencies at the time of induction would eliminate those who have mild chronic defects often missed or passed as suitable for induction. Programs of mental hygiene and rehabilitation in boys' camps, schools and in military training camps can be of value in peace time to treat those emotionally unfit or immature. Vocational training prescribed by the doctor is often necessary for individual cases.

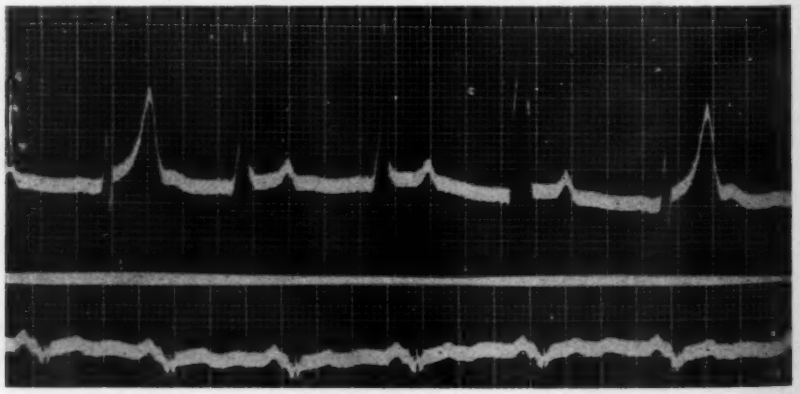
Laboratory work is often helpful, but it cannot take the place of a careful history and examination of the patient. It must be used in conjunction with, and not instead of or paramount to, an accurate history, physical examination and personality evaluation.

Case 1.—In L. S. 126/80, age 21, QRS is 0.12 seconds in lead I and in chest leads. There is right axis deviation. Without the secondary R or initial R wave in CF_1 and CF_2, especially in sternal leads, it would be difficult to say that this was right bundle branch block. They are the deciding factor. This patient had had some hemoptysis at age 16, but no serious cause was found. Again about 6 weeks previously he had some dull precordial aches and occasional sharp pains unrelated to effort or time of day. No malaise, aches or fever. Negative chest films, CBC, sedimentation rate, urine and Kahn. After two months study and observation it was concluded that this represented a congenital or healed damage with right bundle branch block and the prognosis was good. No reasons were found for the period of hemoptysis during the present illness. He progressed uneventfully. There were no symptoms on exertion later.

ECG record after atropine grains 1/75 showed no change.

There was no change with carotid sinus pressure.

Case 2.—M. S., age 34, blood pressure 110/60, height 72 inches, weight 176 pounds, had 2:1 A-V block. The P-R interval varies. He had scarlet fever in April 1945. He developed rash and sore throat while on sulfa. The rash was attributed to sulfa's being given at another hospital for a wound on the extremity. No evidence of cutaneous diphtheria was noted. The history of desquamation of palms and soles points toward the streptococcus throat as cause of rash and/or of the heart block.



Case 4, Fig. 4, N. A.

M. S. one month later shows occasional dropped beats. 0.24 to 0.4 seconds P-R interval with fatigue of AV conduction resulting in no response of ventricle, until recovery, with repetition of this process.

M. S. Two months later, P-R 0.28 seconds.

Case 3.—W. L. S., height 68 inches, weight 175, age 29, rate auricles 215, ventricle 215, had paroxysmal supraventricular tachycardia, T inverted in leads II and III. ST depressed in I, II, III, V. No etiologic cause was found.

W. L. S. A few minutes later after carotid sinus and ocular pressure, there was a return to normal. Blood pressure was 118/60, rate 90, P-R 0.12.

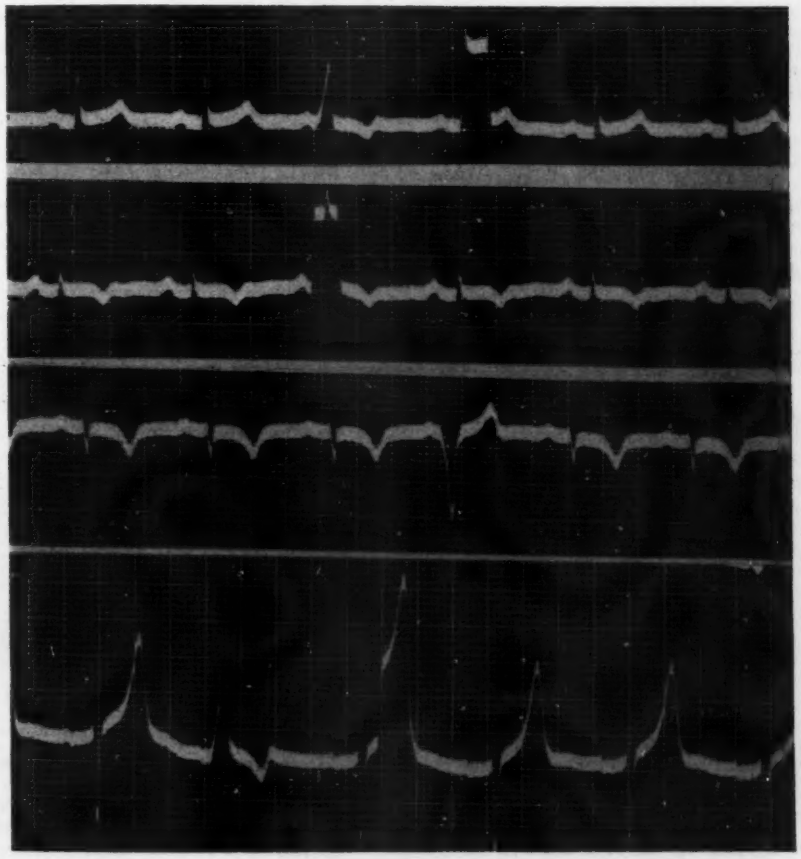
W. L. S. Six months, the rate was 140. P-R 0.14 seconds while standing quietly.

W. L. S. Shows rate decreases to 110 immediately on reclining. There was no thyrotoxicosis or carotid sinus sensitivity, and no fever. Chest films, BMR, CBC, urine, sedimentation rate were normal. This represents chronic auricular tachycardia which has been reported in several cases, with tendency to periods of paroxysmal tachycardia occasionally.

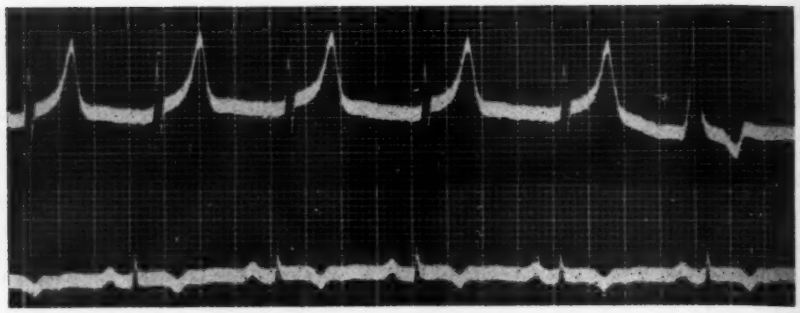
Case 4.—Age 36, height 62 inches, weight 147 pounds, rate 84, this patient shows left axis deviation.

He was admitted for study because of a history of precordial pain with dyspnea on exertion rather suddenly requiring hospitalization for one week in England, terminated because of the patient's insistence that he must go on the Normandy invasion. With aid of his men who dug fox holes and kept him in a vehicle as much as possible, he went through the campaign. This series of records was taken over a year after the above.

There is a short P-R 0.1 second with QRS 0.12 seconds, slurred and notched alternate with groups of normal P-R intervals and QRS complexes which are followed by normal T waves except in leads II and III,



Case 4, Fig. 5, N. A. before atropine



Case 4, Fig. 6, N. A. before atropine

where the T's are deeply inverted. The abnormal QRS are followed by T in opposite direction (*Fig. 5*).

N. A. The same patient as in *Fig. 3*, reclining shows a rate of 84. All QRS complexes are of the normal kind. P-R 0.18 seconds, but T waves are inverted in II and III. One QRS in CF_4 is widened, and, as in bundle branch block, is followed by inverted T. The record taken while he was standing was similar to this. One taken one month later, 45 minutes after atropine grain 1/75 was not essentially altered. There was no change on carotid sinus pressure in ECG before atropine (*Fig. 6*). This series of ECG's represents myocardial damage, probably due to old posterior myocardial infarction with damage to conduction. No periods of paroxysmal tachycardia.

In CF_2 and CF_4, the widened QRS is followed by upright T waves in contrast to the above tracings five days before (*Fig. 4*).

Case 5.—A. L. A., age 34, rate 90, was admitted to another hospital with a diagnosis of ruptured gastric ulcer. He was relieved after a week in bed on a Sippy diet. There was no previous history of trouble or symptoms. He was allowed up and within a few minutes had sudden pain in the legs with cyanosis of the lower legs, worse on left. The legs became cold; there was no pulsation in the vessels of the left leg. Embolectomy was done at the bifurcation of the iliac arteries with some return of circulation to right leg, but the left had to be amputated when it failed to respond to sympathetic block, due to some irreversible damage and vasospasm. The right improved following sympathectomy. ECG taken the day before he was allowed up revealed the presence of changes diagnostic of acute myocardial infarction. This was borne out in changes with serial ECG's taken after he was admitted to our care. Undoubtedly the embolus came from a mural thrombus in the left ventricle. Review of the events in proper sequence, with the electrocardiograms, decreased the probability of any associated thrombo-angiitis obliterans as a cause of the circulatory changes in the lower extremities only.

Case 6.—In A. W., age 22, a bullet produced a 5 cm. laceration ¾ inch deep, of the anterior portion of the left ventricle of the heart, entering the chest at the fourth left costochondral junction and lodging in the left lower lobe bronchus. It entered the pericardium 2 cm. posterior to the phrenic nerve near the hilus of the left lung. Silk sutures were used to close the myocardial laceration but the posterior part of the laceration was too badly damaged to suture. The bullet was removed from the left lower lobe bronchus and the bronchus was closed with sutures by Dr. Brewer. The thorax was closed and catheters were inserted anteriorly and posteriorly in the left thorax with the distal ends under water. Heart sounds were not unusual.

Three weeks later the electrocardiograms were normal except for absent R in lead I with 4 mm. Q waves and high take off and deeply inverted T waves. P waves were notched in I and CF_4 and low in III. T waves were notched in CF_4.

A second electrocardiogram, two days after the first, showed normal P waves, a 3 mm. Q wave and absent R in lead I; a 10 mm. R in CF_4, deeply inverted T waves in lead I with coving of QT segments and 1 mm. T in CF_4. CR_2 was normal. The patient progressed satisfactorily and was evacuated to the United States later.

3720 Washington Boulevard

DISCUSSION (*Abstract*)

Dr. Drew Luten, St. Louis, Mo.—Dr. Edwards commented upon the fact that he sees a certain number of cases of myocardial infarction in relatively young people. The exact explanation of that, so far as I know, is hard to find, except that it has appeared in other reports that nervous tension, is probably an important factor.

It makes us think of the work that Dr. Gilbert in Chicago and others have emphasized, that of nerve influence upon coronary circulation.

Dr. Edwards' paper illustrated, of course, the fact that overseas, as well as anywhere else, one must correctly evaluate laboratory data, electrocardiograms or anything else; and, that as Dr. Ashton said yesterday, after all, the main dependence in proper evaluation must be on a very careful history.

A CONSIDERATION OF CERTAIN FRACTURES OF THE ANKLE*

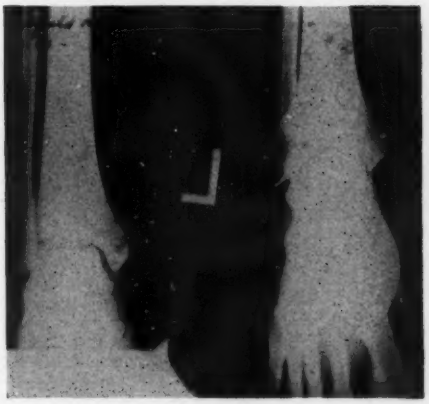
By D. H. O'DONOGHUE, M.D.
Oklahoma City, Oklahoma

For a great number of years, there has been among orthopedic surgeons a considerable difference of opinion, amounting at times to actual controversy, as to the relative merits of open or closed reduction of fractures. By closed reduction I mean a reduction which does not entail actual visualization of the fracture site. This would include, therefore, such measures as manual manipulation, external skeletal fixation and the various types of traction. Open reduction, on the contrary, ordinarily implies actual surgical exposure of the fracture site with some type of internal fixation of the fragments. The extremists in favor of closed reduction insist that open operation should be restricted to those cases in which the various types of closed procedures will not be successful, or have not been successful; they insist that to make a compound fracture out of a simple one adds sufficient hazard that it should be undertaken only in the extraordinary case. At the other extreme are those who advocate open surgery as the procedure of choice, substituting closed procedures only when the extent of the surgery or probable other contraindications make operative procedure too hazardous. Between these two extremes lies the large majority of orthopedic surgeons, who like our political friends, tend more or less to the right or left of center. With perfection of surgical technic, plus the advent of improved types of metal for internal fixation, more and more fractures have been advanced to the category of those in which open operation is the procedure of choice. Typical examples of this are the generally accepted procedure of internal fixation of the condyles of the humerus at the elbow joint, internal fixation for fractures of the patella, open operation for fracture of the radial head with displacement, and many others.

While it will not be feasible in this short discussion to enter into any extensive debate on the pros and cons of this matter, it is my desire to call your attention to another area in the body where open reduction and internal fixation has become increasingly popular. Here, in my opinion, very marked improvement in result can be obtained, both in diminishing the period of disability and in reducing the amount of permanent disability. This work is neither new, nor original and in recent years several well documented articles have been available in the orthopedic literature. However, it has not been sufficiently publicized to those in general practice or to surgeons who do a certain amount of

Case 1

Fracture dislocation of the ankle joint. Complete rupture of the tibiofibular ligament with separation of the ankle mortise, fracture of the tibia and fibula. This type of case obviously requires open reduction, and represents the persistence of deformity caused by eversion force. This is not a typical case with which this paper is concerned.



Case 2

Fracture of the internal malleolus without displacement, which undoubtedly never was displaced. Treated by walking cast. No surgery indicated.

*Read in Section on Orthopedic and Traumatic Surgery, Southern Medical Association, Thirty-Ninth Annual Meeting, Cincinnati, Ohio November 12-15, 1945.

fracture work incident to their general surgical practice.

I refer to fractures about the ankle joint, and for the purpose of this paper, particularly to those fractures about the medial and lateral malleolus, or both, which appear to be simple fractures without gross displacement, but which in a surprisingly large number of cases, result in a very long period of disability, often actual nonunion of the malleolus, and frequently a distortion of the ankle mortise to the extent that permanent instability or pain, or both, at the ankle results. Certain types of fractures about the ankle with gross displacement, joint irregularity and difficult reduction, demand open operation and internal fixation, and these are considered here only incidentally. The situation for which I am proselyting is, I repeat, the fracture of the ankle which has been caused by rather gross displacement at the ankle which may have been spontaneously reduced so that at the time the original x-ray is made, it appears to be a simple fracture without displacement. The temptation is simply to apply fixation as

Case 3

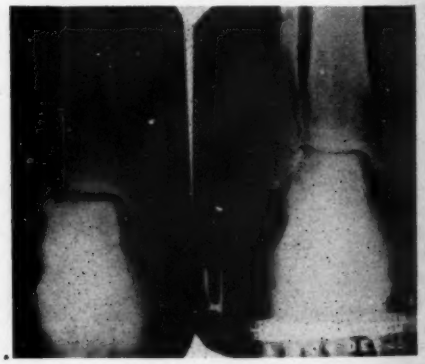
Fracture of the internal malleolus, splitting up the tibia, with complete separation of the external lateral ligament. Internal fixation of the internal malleolus with repair of the lateral ligament. Complete recovery in 8 weeks.

Case 4

Bi-malleolar fracture without gross displacement, but definite separation between the tibia and the internal malleolus. At operation, soft tissue was found to be interposed between the fragments. Weight bearing within two weeks, in a cast. (Postoperative film on left).

Case 5

Bilateral fracture, treated conservatively elsewhere with resulting nonunion of the internal malleolus, tilting of the ankle mortise, instability, pain and disability. This is typical of nonunion resulting from failure of close apposition between the malleolus and the tibia. This is a very common finding.

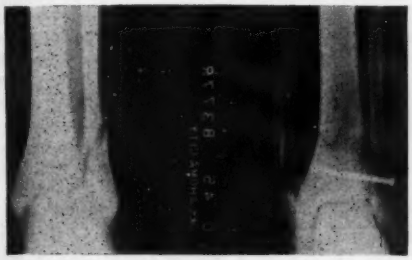


Case 6

Fracture of the lateral malleolus at the level of the joint, with rupture of the internal ligament, lateral displacement of the talus on the tibia, with separation of the ankle mortise. Treated conservatively by the author, with incomplete reposition and resulting instability, pain and continued disability. This case should have been treated by open operation and internal fixation to shorten the period of morbidity, and diminish the permanent disability.

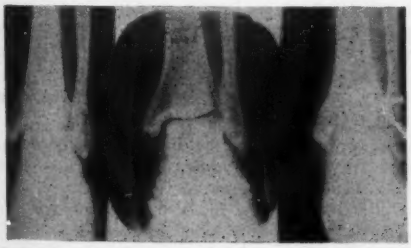
the easiest and quickest method of treatment. There are several factors which should be carefully considered before such treatment is adopted. In the first place, the large majority of fractures of the internal malleolus result from lateral dislocation of the ankle joint. The eversion force tears the medial malleolus away from its attachment to the tibia and in so doing strips a layer of soft tissue across the denuded end of the proximal fragment of the tibia. As the malleolus is replaced, instead of bony contact at the fracture site, the raw end of the malleolus comes in contact with the interposed strip of fascia. This, of course, promotes delayed or nonunion, with resulting long temporary disability and in many instances considerable permanent disability. The second factor to consider is the integrity of the ankle mortise. The internal malleolus of the tibia and the lateral malleolus of the fibula form a mortise into which the talus fits as a tenon. Any separation of this mortise to make it wider results in instability of the ankle joint, so that even a moderate degree of lateral displacement of the external malleolus, either by fracture of the fibula below the level of the ankle joint, or by damage to the tibiofibular ligament demands reduction with adequate fixation which in the majority of instances can be obtained only by internal fixation.

In conclusion, let me make a fervid plea for a very careful analysis of every ankle injury. It must not be assumed in this type of case that closed reduction is, of necessity, the treatment of choice and that internal fixation should be reserved for those cases where trial at closed reduction has failed. Rather, let the two methods stand on their own merits and let a definite selection be made in each individual case, in order



Case 7

Fracture of the lateral malleolus with rupture of the internal lateral ligament, separation of the ankle mortise, similar to *Case 6*. Treated by internal fixation, complete reposition, and perfect functional result.



Case 8

Fracture of the fibula with avulsion of the internal lateral ligament, rupture of the tibiofibular ligament. Closed reduction was attempted and failed to get reposition. Open reduction was carried out the following day. The tibiofibular ligament was found to be torn, the internal lateral ligament inverted and passed between the talus and malleolus. The ligament was repaired with internal fixation of the fibula. Cast four weeks. Returned to work in 3 months, with good functional result.

Case 9-A

Complete avulsion of the internal lateral ligament, rupture of the tibiofibular ligament, dislocation of the talus on the tibia, and separation of the ankle mortise. The original x-ray was made with the foot held in a neutral position, and was diagnosed sprain and treated elsewhere for a period of four weeks for a sprained ankle.

Case 9-B

Open operation, repair of the internal lateral ligament, fixation of the fibula to the tibia with vitallium screw. Perfect functional result.

to be sure that that particular case has the shortest morbidity, plus the least permanent disability.

DISCUSSION (*Abstract*)

Dr. J. Hadley Caldwell, Newport, Ky.—This is a very common injury, which almost everyone who does surgery, even many who do what they call minor surgery, often sees.

To get the active joint into proper position is the great thing. Many of these fractures with dislocation of the ankle will come into position easily when the muscle is relaxed. When they are in the proper position with the proper plaster dressing to hold it, there is no need of open reduction or open operation.

No doubt many of these cases would do better if they were operated upon and put into position with some metal fixation, because then we know we have them in position. A point not mentioned is one I was taught many years ago when I was in college, about fractures with dislocation of the ankle joint. It is to get the muscles well relaxed with anesthesia, and to see that the foot is at right angles; also, invert the foot and hold it there.

I always try to hold it up with the foot turned in. I tell the patient when he awakens that it is crooked, but I put it that way on purpose. I put the patients on their feet rather early, and find they have a much stronger joint.

If you put it up anatomically straight, after the patient begins to walk he will often have a weak ankle, tending to eversion. As we put our weight on our foot the arch gradually gives down with eversion. That is the first symptom in so-called weak arch or flatfoot.

I think if those cases are put up in good position with over-correction of inversion, and complete right angle of the foot, if there is no soft tissue intervening we get excellent results. But they should be x-rayed by a competent x-ray man, for many at a glance look as though they are all right. Where there is a slight separation, that is not right, and if there is a little lateral dislocation the line of weight-bearing is not true, and the patient will have trouble walking the rest of his life.

Dr. Lenox D. Baker, Durham, N. C.—At the start of the Japanese-Chinese war, the first hospital bombed was a Christian Hospital, the surgeon of which had been in China twenty-five years. He came to Duke Hospital because of the work being done there on sprue, and he visited in the Orthopaedic Clinic for some time. At that time we were using the Bohler skin-tight cast with a walking iron attached in the treatment of fractures about the ankle. This missionary surgeon asked if we had ever used a Delbet cast. Many of you older men probably know this method. The old gentleman told me he had been using it in China for twenty-five years in the treatment of fractures of the tibia and fibula and that he had been getting good results. For the past six years we have used it for simple fractures of the malleolus of the fibula and for bi-malleolar fractures, but not for tri-malleolar fractures where there has been posterior luxation. As can be seen in any of the older fracture books, the Delbet type of cast allows flexion and extension of the ankle joint without lateral motion in the subastragalar joints, which allows weight bearing without endangering the position of the fracture fragments. By removing the lateral portions of the counter of the heel of the shoe, the foot of the injured leg can be splinted satisfactorily and the patients can get about with less difficulty than is encountered with the usual form of walking casts. Patients have been more comfortable with this type of cast than they have been when treated with a standard walking cast. We have seen no ankle stiffness; we still see some muscle atrophy, but not so much as in the cases where the foot is incorporated in plaster. The cast will not allow lateral motion and does not allow strain on the lateral or medial malleoli.

Dr. J. Warren White, Greenville, S. C.—Hereafter I will look a little more closely at my x-rays, and possibly I will see more indication for open reduction. At the present time, I would not, in some of his cases, have done an open reduction.

There are two points I want to bring out which have been of help to me in understanding some of these fractures. One is to take oblique x-rays, just as you take oblique x-rays of carpal scaphoids. You can miss a displacement or nonunion with simply an anterior posterior and lateral x-ray, that is plainly obvious in the oblique x-ray. It is in the older fractures that have been sustained six months or so earlier, which have not done well, where you can pick up a nonunion.

The other point I want to mention which has been of help to me in obtaining better closure of the mortise has been the use of a sponge rubber pad on either malleolus. It is a pad possibly the size of the palm of your hand, put in under the plaster, forcing the two sides of the malleolar mortise together.

Dr. O'Donoghue (closing).—I tried to emphasize that I am not advocating open reduction in all cases of malleolar fractures, but I am advocating that it be considered, that analysis of the case be made to be sure that open reduction is not indicated, in order to do two things: one, to cut down the length of time of disability, and the other, to reduce the degree of permanent disability.

It is very difficult to say specifically what the indications are for surgery in any group of cases. Several things should be considered very definitely. If we have a fracture of the internal malleolus that we are unable to replace and hold in good apposition, we should by all means consider whether or not there is soft tissue interposition.

One is astounded in doing operations before resident staffs to see how very skeptical some residents are. They are surprised that almost uniformly we can hardly see the raw end of the tibia, because of the imbedding of the ligament into the raw fracture line.

Another indication is where there is a bi-malleolar

fracture at approximately the same level, so that even without anesthesia we can slide the ankle back and forth across the lower end of the tibia.

It is difficult for me to hold the fracture in the right position when it is perfectly free to go in either direction whereas if we get one fixed point we can then get good position of the opposite side. It is seldom necessary to do both sides.

Another point is this. When the x-ray technician makes the picture, urge him not to correct the deformity. Make the picture in the condition that the leg comes into the emergency room, because we get surprisingly good appearance in x-rays sometimes, and think that there has been no displacement; but if we take the foot in our hand, particularly under anesthesia, we can mobilize the foot completely in both directions.

I think oblique x-rays are very valuable if there is doubt in one's mind as to fragmentation, or if there is a question of nonunion, but I am referring particularly to the acute case in this discussion.

I would like to refer to Dr. Caldwell's comment about inversion. To my mind, the old classic position is extremely dangerous. If the malleolus is loose and we invert the foot, we may push the malleolus too far. That can be obviated by careful x-ray check after reduction.

Another thing: if the foot is put up in inversion (and I am sure the doctor did not mean it is left there all the time) but if it is left there any length of time we have an inversion deformity of the ankle which is practically an impossible position to walk in.

If I had to take a choice, I would prefer to have the foot fixed in eversion rather than a foot fixed in inversion from the standpoint of disability and ability to walk; so that if the inverted position is used, I beg you, do not leave it there too long. If you do, you will then spend the rest of the rehabilitation period fighting the deformity rather than trying to heal the fracture.

TREATMENT OF CREEPING ERUPTION (LARVA MIGRAN)*

By HOWARD HAILEY, M.D.
Atlanta, Georgia

Creeping eruption is an acute inflammatory condition of the skin due to the larva of the cat or dog hookworm. Kirby-Smith, Dove and White[1] identified the hookworm as Ancylostoma braziliense. Because of the prevalence of this infection along the South Atlantic coastal area, I am led to believe that the turtle or some other form of sea life might also be a host for this type of hookworm. Then too, the human being might even be host for the causative organism.

In the past, we thought of this infection as being indigenous to the coast. It is not uncommon to see patients from near and in Atlanta with creeping eruption even though they have not been out of the county or city. Atlanta is more than 300 miles from the coast. In 1926 the author[2] reported two cases of creeping eruption in patients who had not been out of the city. In recent years travel to and from the coast (dogs and cats going on the vacation trip) and the importation of shrubbery with attached infected soil have accounted for the increase in the number of patients who live inland.

Creeping eruption begins as an inflammatory papule which is present from hours to several days. From this papule, a blunt pointed elevated line or protrusion extends itself. This burrow represents the progress of the nematodal larva. The lesion advances at the rate of one quarter to one or more inches in twenty-four hours. The parasite frequently follows a tortuous course and like Bre'r Rabbit, turns around or circles and back tracks his previous course. Vesicles, bullae, hemorrhage, pyogenic infection, edema and local urticaria are common primary and secondary lesions which accompany creeping eruption and greatly alter the size and appearance of the lesions.

On October 24, 1945, I saw a patient with only one burrow on the palmar side of the right hand at the base of the fifth finger. The parasite had completely encircled the fifth finger. The infection was obtained while the patient rubbed his hand in the earth in order to get a better grip on his golf club. In contrast to this case, I have had another patient who had several hundred lesions. He had covered his body with damp sand. One larva entered the urethra and remained inside for two months as evidenced by the disappearance of the burrow from the glands into the urethra and by the subsequent intense pruritus within the urethra. Cure was spontaneous.

The diagnosis of creeping eruption is usually easy. Often the history is very helpful. Occasionally, because of complications due to in-

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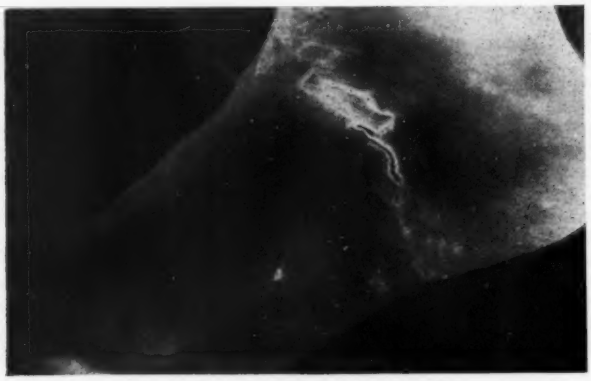

Fig. 1
Creeping eruption.

fection and irritating applications, the diagnosis is delayed a few days until the larva moves into a clear field. Scabies, prurigo mitis, insect bites and even erysipeloid are the most likely conditions to confuse the diagnosis.

TREATMENT

The large number of treatments for creeping eruption is good testimony to the fact that a better one is to be greatly desired. As is well known, all treatments that are effective offer some objections. Fuadin had apparently solved the problem but further use dampened my enthusiasm.

During the current year I have used onion poultices in the treatment of creeping eruption. The Encyclopaedia Britannica (1943) has the following to say about the onion:

"Onion, Allium Cepa (family liliaceae) a bulbous biennial cultivated from time immemorial. Represented on Egyptian monuments and one variety cultivated in Egypt was awarded divine honour."

The method of treatment is as follows:

Large white onions are grated coarsely. A sufficient quantity of onions may be grated at one time to make several poultices. The unused portion should be kept in the ice box in a screw top jar or tight fitting covered container. A piece of gauze is selected according to the size of the affected parts of the skin. Using a tongue depressor or a butter knife, plain white vaseline is spread over the gauze in order to hold the onion in contact with the skin. The finely chopped or grated onion is spread over the vaseline surface in a thickness of approximately ⅛ to ¼ inch. The skin should be thoroughly cleansed with soap and water before the poultice is applied. After the poultice is applied, it should be held in place by the proper size bandage. The poultice is covered with waxed paper or some impervious material. This, in turn, is fixed by a bandage or scotch tape. Waxed paper bags, shower caps or large size rubber gloves as well as many other articles make excellent coverings over the poultice in order to preserve the moisture. The poultice is applied at night and left on all night. Three to seven nightly poultices have cured four patients under my care. In this limited number of patients the results of the onion poultice treatments have been as satisfactory as the use of ethyl chloride in similar patients.

The advantage of the onion poultice treatment is that there is no pain. It is cheap and practical in the treatment of selected patients. The only disadvantages are the odor and the time required by the mother or nurse to prepare the treatment properly. During busy office hours, I know of no other treatment that upsets an entire office more than the use of ethyl chloride on screaming, struggling children infected with nematodal larvae.

This treatment is reported with the hope that some other dermatologists will give it a trial to determine its true value. Further, I hope that some of us will continue to use various other pungent, penetrating substances with a view in mind of finding a painless, simple treatment for this troublesome condition.

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Suite 107 Doctors Building

DISCUSSION (*Abstract*)

Dr. Joseph M. Hitch, Raleigh, N. C.—This condition has constituted quite a problem at my duty station dur-

ing the past summer. I must admit, however, that I had not anticipated a new treatment of creeping eruption of the order just described. Since I received a copy of Dr. Hailey's paper I have not had a fresh case to test under onion poultice therapy but I shall certainly welcome the first opportunity to do so.

In an effort to find something pertinent to say regarding this particular mode of treatment, I searched the U. S. Dispensary and found that the chief chemical, and apparently the one on which the odor depends, is allyl sulphide. This in turn led me to a synthetic chemical-allyl sulfourea, usually known as thiosinamine or fibrolysin. This is reputed to have the property of resolving scar tissue, presumably by reducing collagen to gelatin. It has been used in such conditions as keloids and esophageal stricture. It is conceivable that some synthetic compound related to whatever is the active principle in the onion may, by systemic or local administration, prove to be the answer in the treatment of this condition.

Having in mind that some of the members, particularly those from the extreme southeastern states, may wish to explore further the various possible treatments of creeping eruption, I shall briefly mention recent personal experiences which will be submitted for publication at a later date. I am currently stationed at a large Marine base on the coast of North Carolina. The region is quite sandy and during the past summer was excessively wet. Both the veterinarians at the War Dog Training School and I have found that a high percentage of the numerous dogs and cats are infested with Ancylostoma braziliense.

The first cases I saw were in June. I have no idea why they did not appear with the advent of warm weather. Since that time I have treated somewhat over 30 cases and there are many more who have sought medical care elsewhere. Following Dr. D. C. Smith's discovery of the efficacy of "fuadin" (sodium antimony biscatechol disulfonate of sodium) in this larval disease, the first group of cases (approximately 15) were treated with the drug in amounts proportionate to the size of the individual. A few of these cases were definitely cured with as few as two injections, while others showed continuing activity after as many as 23 treatments. This led me to try related compounds, tartar emetic and "neostibosan" (phenylstibonic acid, p-acetyl-aminophenylstibonic acid, antimonic acid and diethylamine). Several patients in whom "fuadin" had proved an ineffective larvicide responded to "neostibosan." However, the total percentage of cures was not superior to those of the first-mentioned drug. Tartar emetic was not used extensively but did prove to have specific larvicidal properties. These failures with single or several antimony compounds led me to the consideration of an allied chemical, arsenic. So far "mapharsen" which has been employed in 13 cases is the only one investigated. Some are currently under treatment so that it is impossible to make a final evaluation. It appears that the results are somewhat better than with any of the antimony compounds and that this superiority is particularly evident in the smaller number of injections often necessary. It must be added, however, that some have failed to achieve a cure after as many as 12 injections.

I have been unable to recognize any factor common to those patients who have done poorly with any one or combination of drugs. I do feel that the results so far with "mapharsen" are sufficiently encouraging to justify further study of this and other arsenicals.

In passing, I should like to mention that we obtained x-rays in 12 of our patients but in none did we find areas of transient migratory pulmonary infiltration as described by Wright and Gold in the Journal of the American Medical Association this year (p. 1080, August 11.)

As Dr. Hailey mentioned, any reasonably efficacious treatment of larva migrans which will obviate the necessity of applying ethyl chloride to infants and young children will be a boon in the therapy of this condition. Intravenous medication such as "mapharsen" and tartar emetic has an obvious drawback in small children, the usually affected age group. In certain anatomical regions even local applications such as the poultice described by Dr. Hailey might prove difficult. Since Dr. Smith pointed the way with "fuadin" it seems reasonable to believe that continued search will reveal a more highly effective remedy capable of administration by mouth or intramuscular injection.

Finally, as pointed out in the original articles by Dr. Kirby-Smith and subsequently observed by many others, the larva of Ancylostoma braziliense may exhibit periods of dormancy up to several weeks. This must be reckoned with in the evaluation of any new treatment for creeping eruption.

Dr. James G. Thompson, Jackson, Miss.—My experience in the treatment of larva migrans has been that it is sometimes difficult to get a diagnosis. I have seen cases in which the secondary infection and the eczematoid reaction set up by the use of home remedies completely clouded the picture to the point where you could not tell whether the patient had dermatophytosis, or what. But after the application of wet compresses for a few days the organism migrates, and can be seen.

A method of spread that I have noted in my home town is that patients play in sand that has been brought in for use in construction. I do not know whether the sand becomes contaminated after it gets there or whether it comes in contaminated, but I have had several cases in the office in which the children actually contracted the disease around construction that was going on near them.

All of you who have ever treated larva migrans have some remedy. You may have half a dozen or so. Ethyl chloride used in areas not too large has worked very well for me.

Chrysarobin and chloroform painted on small areas seem to be useful. Of course, chrysarobin is a very dangerous drug which should be used very carefully, and should be applied only by the physician.

"Fuadin" has been used. It is a sodium antimony

product. It seems to me that unless it were absolutely perfect it would not be correct to use a heavy metal intramuscularly in a disease that could be cured otherwise. I imagine it would be a very good idea to use "fuadin" in a more or less generalized case, but for a localized case it is not the ideal remedy.

I had thought, in considering the treatment with onion poultice, that perhaps we could find what part of the onion it was that did the work. If it is the essential oil that does it, we might isolate that oil and save the mother the trouble of crying while she grates onions.

Dr. Dudley C. Smith, Charlottesville, Va.—I would like to say just a word about how I happened to use "fuadin" in the treatment of this condition, which was reported in 1943. A two and a half-year-old boy came into the office complaining of intense itching and burning in the perineal area. The signs and symptoms were perfectly typical of creeping eruption. The child had not slept for several nights being disturbed by the itching and burning. It would be difficult to freeze the area with ethyl chloride or other applications without general anesthesia.

On my desk happened to be a 30 c. c. bottle of "fuadin" labeled "For Veterinary Use." The drug is effective in heartworm in dogs which is due to a larva.

The child was given 2 c. c. of "fuadin" intramuscularly, and because of the fact that we have used it in treating Vincent's infection once a day for several days, I advised the home physician to continue it. That night the child slept perfectly well and had no more discomfort. At the insistence of the home physician the mother allowed him to continue these injections for a week. The mother would not allow him to give more injections because the child was perfectly well.

Since that time a number of cases have been reported treated with "fuadin," some with very good results and others with failure. I do not know just what the basis is for this difference. The larvae causing creeping eruption come from many sources such as flies, and intestinal parasites. Dr. Hailey suggested turtles. There may be different varieties of larvae which may not be affected by this antimony preparation. Dr. Hitch mentioned the fact that he had used other antimony preparations and arsenic.

"Neostibosan" might cure some of the patients in whom "fuadin" fails. In the April, 1944, issue of the *Journal of the Florida Medical Association*, Dr. J. F. Wilson reported a group of cases in seven of which he obtained cures following one injection of "fuadin." Two of the cases that he treated required a second injection. All of his cases were eventually cured.

Dr. R. D. Hollowell, a health officer in Florida, wrote me last year that he had treated seven cases, mostly in children. Five of seven were cured completely by one injection. Two were cured with the second injection.

If the individual case is due to a larva which is susceptible to antimony, it certainly is an easy way to handle it. In extensive cases which may have several hundred tracks or burrows, treatment with ethyl chloride may cost two to three hundred dollars, and it is certainly an uncomfortable procedure and not nearly so simple as Dr. Hailey's remedy.

Some of these cases are certainly very susceptible to antimony, and where this is true it is an easy, simple agent to give. This agent has very low toxicity, and 3 or 4 c. c. intramuscularly is probably sufficient.

I hope more investigation will be done on this subject to determine which species of larvae are susceptible to "fuadin."

We do not see much larva migrans in Virginia. The case I reported was acquired in South Carolina. We had two cases, though, that were acquired at Virginia Beach several years ago.

Dr. A. H. Lancaster, Knoxville, Tenn.—The problem of diagnosis of larva migrans is not always easy. Difficult experience that I have had in this field was in the army. In the fall of 1942, we had a group of soldiers who had been on maneuvers in Louisiana. These men were from Texas. The first who came under my observation was a full colonel in the cavalry. For the three months since his return from maneuvers, he had had pruritic papules over his buttocks and back. The lesions varied in size from about 2 cm. down. There was no linear evidence, not even suggestive evidence, of larva. The surgeons had about decided to excise some of those areas of skin from his buttocks, back and shoulders. We tried, as an antipruritic agent, freezing with ethyl chloride. The patient returned in two or three days. Some of the lesions were involuting nicely; from some of the others that we sprayed, the larva was creeping out as much as an inch.

Then the question arose: have we an unusual variety of the larva that remains localized? And for how long? We did not know, so we sprayed other areas with about 50 per cent of the amount that we would expect to kill the larva. The next time he came back the larvae were creeping out from all the sprayed papules. We treated all the lesions with a lethal dose of ethyl chloride. The patient got along nicely. We treated others of his organization in the same manner with an equally good response.

Since these men had been in an area where they said they slept on the ground and had trouble keeping dry, the source could have been raccoons, foxes, or cats.

This discussion is presented as a diagnostic problem encountered in the service.

Dr. C. A. Andrews, Tampa, Fla.—Dr. Lancaster has brought out a point that we have known in Florida for some time: that the diagnosis may be difficult, but if you will freeze the doubtful lesions, in 24 hours you will see migration of larva.

In Florida we see many cases of larva migrans. The disease is an economic as well as an industrial problem.

I have seen over 100 cases within the last three months. Many of the patients had worked for termite exterminator companies, and these men came in with extensive lesions. The incidence of the infection is due to the incidence of the rainy season, and this summer we had a very heavy rainfall. The rivers and lakes overflowed, carrying the infection under the houses, and made it very easy to pick it up there.

The information that Dr. Dudley Smith has given us has been the most important step forward in the handling of larva migrans. This year in adults I often gave two injections a day, one in the early morning, and the other in the late afternoon, and it seemed to me that this worked much better than the single daily injection. In children, a small dose is first administered, and usually they will tolerate 5 c. c. As far as I could see, there was no untoward result from the use of this drug.

I would suggest to Dr. Hailey, however, since he has worked on the onion, and since people who have had experience with dogs have used garlic by mouth for intestinal infections, that he investigate garlic.

Dr. M. T. Van Studdiford, New Orleans, La.—Since the start of training of police dogs in Gulfport, we have seen many cases of creeping eruption, especially since the dogs have left and people have taken sand out of the runways for children's play boxes.

There are three foci of creeping eruption in Louisiana. One of them is in Covington which is very sandy, but most of our cases have been traced back to a sand box or under a house where a shepherd or a police dog was kept.

"Fuadin" cures about half of our cases. For the rest of them we depend not upon ethyl chloride but upon carbon dioxide ice which I think is five or ten times as efficacious as ethyl chloride spray.

Dr. Everett R. Seale, Houston, Texas.—When cases of creeping eruption are seen very early while still in the urticarial phase, it is quite difficult to identify definite tracks. I would like to suggest the use of ethyl acetate in collodion as a paint twice daily for relief of symptoms until it is possible to institute treatment of the individual lesions. In my experience carbon dioxide snow has been much more satisfactory than freezing with ethyl chloride. It is much more rapid and in children it does not elicit so much immediate discomfort as does ethyl chloride. To prepare the ethyl acetate-collodion mixture, the ether is evaporated off the collodion and replaced with ethyl acetate.

Dr. Hailey (closing).—The various treatments which have been used were purposely omitted. However, their large number is proof that as yet we have not a treatment which is satisfactory in most cases. Dr. Smith mentioned the possible benefit which might follow the arsenicals. Twenty years ago I used neoarsphenamine in the treatment of several patients without any benefit to them.

DERMATITIS HYPOSTATICA: COMBINED DERMATOLOGICAL AND SURGICAL TREATMENT*

By J. Lamar Callaway, M.D.,
Kathleen A. Riley, M.D.,
Beatrice H. Kuhn, M.D.,
and
Sherwood W. Barefoot, M.D.
Durham, North Carolina

Dermatitis hypostatica and its sequel, varicose ulcers, are among the most recalcitrant dermatoses, due in part to negligence of the patients, but due also to failure of the physician or dermatologist to recognize, evaluate, and treat the fundamental etiologic factors. It is for this reason that we are presenting our material with the hope that a spirited discussion may be effected in which various diagnostic and therapeutic measures may be considered.

During the past several years, we have paid particular attention to this problem. We have come to look upon the difference between stasis dermatitis and varicose ulcers as relative, since certainly a stasis dermatitis of sufficient severity and duration will eventually show ulceration and perhaps even bone changes, as Bertwistle[1] has reported a patient in whom there were radiographic bone changes associated with a varicose ulcer.

The establishment of the proper etiologic agent is of the utmost importance in dealing with stasis dermatitis and ulcers. In too many instances patients are treated as having a contact dermatitis, dermatophytosis, drug eruption or some other dermatosis with no attention being paid to the peripheral vascular disease. Obvious varicose veins will at once suggest the probable cause, but preliminary studies should be made to rule out cardiorenal disease, disturbances in the portal circulation, diabetes, pelvic disorders, diseases of the hematopoietic system, peripheral obliterative arterial disease,

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*From the Division of Dermatology and Syphilology of the Department of Medicine, Duke University School of Medicine.

and trophic disturbances, after which the differential diagnoses listed in *Table 1* must be considered.

We are in complete agreement with Luke[2] that too often the tendency is to devote too much time to the local treatment of a varicose ulcer or stasis dermatitis and too little consideration to the etiologic factors. In most cases, dermatitis hypostatica will clear up promptly with complete bed rest, elevation of the extremities and simple wet dressings with local applications of 1 per cent gentian violet in 10 per cent alcohol. Many times, however, because of the impaired circulatory return, the involved tissues are heavily invaded with pyogenic organisms or fungi, and the lesions are much more stubborn. It is, of course, not uncommon in such cases to see the development of a disseminated bacterid or dermatophytid, as shown in *Fig. 1* and demonstrated by *Cases 16* and *20* in *Table 2*.

Although temporary control of dermatitis hypostatica can usually be accomplished with relative ease, the prevention of recurrences presents a much more difficult problem. It is our feeling that measures such as elastic type bandages over the lower legs, elastic stockings and jelly boots are of limited value in the temporary management of complications arising from venous stasis due to varicosities. If it is at all possible, the patient should be put to bed in a hospital under the care of a dermatologist until the dermatitis is controlled and the patient is ready for surgical treatment of the venous stasis.

DIFFERENTIAL DIAGNOSES

(1)	Dermatitis hypostatica (stasis eczema, varicose eczema)
(2)	Dermatophytosis
(3)	Contact dermatitis
(4)	Drug eruption (atabrine, iododerma, bromoderma)
(5)	Atypical lichen planus
(6)	Sickle cell anemia (Negro patients)
(7)	Simple pyodermia
(8)	Blastomycosis
(9)	Erythema induratum
(10)	Neurodermatitis
(11)	Carcinoma
(12)	Syphilis

Table 1

It is not our purpose to discuss the surgical procedures of choice. Discussions on this subject will be found well covered in articles by Coombs,[3] Adams,[4] McCallig and Heyerdale[5] and others. Most of the patients in our series were treated by ligation of the saphenous vein and excision of the varicosities, followed by injections of sclerosing agents into any remaining superficial varicosities, after a complete peripheral vascular survey had been made to show the adequacy of the deep circulation.

We have attempted to make a statistical study of our patients with stasis dermatitis, with and without ulcers, who have been treated surgically

Fig. 1

Dermatitis hypostatica with secondary fungus invasion and an acute disseminated dermatophytid.

for their varicosities. Unfortunately there are only thirty-two patients who have had follow-up examinations for over one year who are included in this report. Several times this number have been treated but cannot be included since we have no specific information as to their

No. of Pts.	Dermatitis Only	Dermatitis and Ulcer	Duration	History of Thrombophlebitis	Associated Generalized "Id"	Degree of Improvement*	Recurrence after Surgery (Dermatitis +) (Ulcer ++)
1		Yes	3 yrs.			Excellent	
2	Yes		8 mos.			Excellent	
3	Yes		2 yrs.			Excellent	
4	Yes		4 mos.			Excellent	
5	Yes		1 yr. 4 mos.			Excellent	
6		Yes	4 mos.			Excellent	
7		Yes	6 yrs.			Excellent	
8		Yes	1 yr. 3 mos.			Excellent	
9		Yes	2 mos.			Excellent	
10	Yes		1 yr. 6 mos.			Excellent	
11		Yes	1 yr.			Good	+
12		Yes	3 yrs.			Good	+
13		Yes	8 yrs.			Good	+
14		Yes	1 yr.			Good	
15		Yes	2 yrs.			Good	
16		Yes	3 yrs.		Yes	Good	+
17		Yes	15 yrs.	Yes		Good	+
18		Yes	5 yrs.	Yes		Fair	++
19		Yes	8 yrs.			Fair	++
20		Yes	10 yrs.		Yes	Fair	+
21		Yes	6 yrs.			Fair	++
22		Yes	20 yrs.	Yes		Fair	++
23		Yes	9 mos.			Fair	++
24		Yes	26 yrs.	Yes		Fair	+
25		Yes	15 yrs.			Fair	++
26		Yes	3 yrs.	Yes		Fair	+
27		Yes	2 yrs.	Yes		Fair	++
28		Yes	2 yrs.			Poor	++
29		Yes	30 yrs.			Poor	++
30		Yes	10 yrs.			Poor	++
31		Yes	9 mos.	Yes		Poor	++
32		Yes	23 yrs.	Yes		0	++

Excellent	is complete dermatological cure.
Good	is 75 per cent dermatological improvement.
Fair	is 50 per cent dermatological improvement.
Poor	is 25 per cent dermatological improvement.
0	is no dermatological improvement.

Table 2

final results. It seems fair to assume that some of them must have had good results, or otherwise they would have returned.

The thirty-two cases included in this analysis have been followed for a sufficient length of time to enable us to form a definite opinion as to their permanent results. These patients have been followed for a minimum of one year and have indulged in such activities as would seem to warrant an opinion as to what they might reasonably expect in the future insofar as recurrent complications from stasis is concerned.

AVERAGE DURATION PRIOR TO PRESENT HOSPITALIZATION AS RELATED TO THE DEGREE OF IMPROVEMENT OF STASIS DERMATITIS AND ULCERS

No. of Pts.	Average Duration		Degree of Improvement
10	1 yr.	8 mos.	Excellent
7	4 yrs.	9 mos.	Good
10	9 yrs.	7 mos.	Fair
4	10 yrs.	8 mos.	Poor
1	14 yrs.	8 mos.	0

Table 3

ANALYSIS OF CASES

It will be noted in *Table 2* that of the thirty-two patients, five had dermatitis hypostatica uncomplicated by ulceration (*Fig. 2*) or a history of thrombophlebitis, all of whom showed complete relief of dermatological symptoms following surgical treatment of the varicosities. The average duration of the dermatological complication in these patients had been fourteen months.

There were eight patients with a history of thrombophlebitis, in whom there was an average improvement of about thirty-seven per cent. One of these patients with thrombophlebitis of twenty-three years duration showed no improvement following surgical treatment of the varicosities.

Five patients with dermatitis hypostatica, complicated by the development of varicose ulcers, showed 100 per cent improvement following surgical treatment (*Fig. 3*). The average duration of dermatological complications in these patients was twenty-six months (*Cases 1, 6, 7, 8* and *9*). There were six cases with ulceration, uncomplicated by thrombophlebitis,

Fig. 2
Dermatitis hypostatica uncomplicated by ulcers.

Fig. 3
Varicose ulcers.

who obtained good results (seventy-five per cent improvement) following surgical treatment for their varicosities. The dermatological complaints in this group had existed for an average of thirty-six months prior to surgery for the varicosities. In eight cases, complicated by ulceration, excluding those with a history of thrombophlebitis, the improvement obtained from surgery for the varicosities was fifty per cent or less. In these patients the dermatological complication had been present for an average of more than ten years prior to hospitalization for surgery.

Table 3 demonstrates that the degree of improvement obtained from surgical treatment for varicosities varied inversely with the duration of the dermatological complications in our thirty-two patients.

DIAGNOSTIC PROCEDURES AND MANAGEMENT

In *Tables 4, 5* and *6* we have attempted to show schematically what we consider an optimum regime for dealing with patients with dermatitis hypostatica.

OPTIMUM DIAGNOSTIC PROCEDURES

- (I) Careful history and physical examination
- (II) Peripheral vascular studies
  - (A) Adequate tests should be done to establish competence or incompetence of the following venous systems:
    - (1) Superficial saphenous system
    - (2) Communicating veins
    - (3) Depp venous system
  - (B) The following procedures may be used as adjuncts:
    - (1) Infra-red photography
    - (2) Venography
- (III) Urinalysis
- (IV) Blood chemical studies
  - (A) Fasting blood sugar
  - (B) Non-protein nitrogen
- (V) Hematological studies to eliminate the following:
  - (A) Sickle-cell Anemia (Negro patients)
  - (B) Nutritional anemia
  - (C) Leukemia
- (VI) Serological test for syphilis
- (VII) Routine smear and culture for bacterial organisms
- (VIII) Microscopic examination of material in 10-20 per cent potassium hydroxide and culture for fungi
- (IX) Intradermal tests to trichophytin, oidiomycin, staphylococcus toxoid, and autogenous vaccines
- (X) Biopsy if unable to establish a diagnosis by the above procedures

Table 4

SUMMARY AND CONCLUSIONS

The number of cases included in this study is too small to draw dogmatic conclusions, but certain general statements can be made:

(1) Temporizing in the case of dermatitis hypostatica with or without ulcers due to varicosities is never justified. Surgical treatment of

TREATMENT FOR ACUTE DERMATITIS HYPOSTATICA

- (I) Hospitalization
- (II) Complete bed rest
- (III) Elevation of the feet
- (IV) Continuous wet compresses
  - (A) Solution of 1:4000-6000 of potassium permanganate usually preferred
  - (B) Solution of 0.5 per cent Burow's solution (aluminum acetate), normal saline, and weak solutions of boric acid may also be used
- (V) 1 per cent gentian violet in 10 per cent alcohol locally
- (VI) Penicillin or sulfonamide, if considerable secondary infection is present
- (VII) Treatment of contributing or aggravating factors
  - (A) Regulation of diabetes, if present
  - (B) Compensation of cardiac decompensation, if present
  - (C) Treat anemia and deficiencies
  - (D) Sedation when necessary for apprehension and nervousness
  - (E) Correction of edema of renal origin
  - (F) Removal of any foci of infection which may be contributing factors
  - (G) Antisyphilitic therapy if indicated
  - (H) Correction of pelvic pathology
- (VIII) Local Treatment of "id" which may be due either to bacteria or fungus
  - (A) Soothing lotions
  - (B) Calcium by mouth or intravenously
- (IX) Peripheral vascular consultation after patient is ready for surgery—Surgical treatment of varicosities
- (X) Skin grafting of ulcers which will not heal

Table 5

OPTIMUM POSTOPERATIVE MANAGEMENT

- (I) Reduction diet if obese
- (II) Jelly boot, elastic stockings, or elastic bandage during postoperative adjustment period, until leg veins are compensated
- (III) Avoid trauma
- (IV) Change of occupation, if indicated
- (V) Avoid excessive dependency of feet and legs
- (VI) Avoid garters and girdles
- (VII) Avoid constipation
- (VIII) Warn female patients of possible dangers from pregnancies
- (IX) Assiduous treatment of even minimal bacterial or dermatophytitic foot or lower extremity infections

Table 6

the varicose veins should be performed at the earliest feasible moment.

(2) In our series, the results obtained from surgical treatment of varicosities for dermatitis hypostatica prior to the development of ulcers are excellent whereas the prognosis diminishes rather markedly with the onset of ulceration and thereafter roughly varies inversely with the duration of the dermatological complication.

(3) As would be expected, the degree of improvement devised by surgical treatment of varicosities is much less in patients with a history of thrombophlebitis, even when the usual tests show an adequate deep circulation, than among patients with uncomplicated varicosities.

(4) A dermatological regime for the management of hypostatic dermatitis and ulcers has been presented.

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DISCUSSION (*Abstract*)

Dr. Ashton L. Welsh, Cincinnati, Ohio.—I agree with Dr. Callaway that dermatitis hypostatica is one of the problems in our field which has been for the most part poorly handled. Only if some effort is made to correct the underlying circulatory disturbance is any permanent effect going to be achieved.

These patients should be studied thoroughly from the general physical standpoint. Dr. Callaway pointed out the fact that many systemic factors influence their progress. Local infection is of marked importance. After the local infection has gone on for a while, due to the poor circulatory set-up, not infrequently they become sensitized to the bacterial products of their infection. The superimposed sensitization affair complicates their management.

Since many of the local contaminating organisms are commonly carried in the intestinal tract (the normal intestinal flora) and in other foci (staphylococci, streptococci, and so forth) if the patients once become sensitized, then the factor of absorption from such foci will add to the difficulty.

It is important not only to investigate the question of bacterial sensitization in these patients, which we have done by a rather peculiar circuitous route, but, in addition, if their sensitization is proved to be to organisms they are likely to carry in foci of infection, it then is important to go ahead with adequate focal studies to control that source.

We have gradually over a period of time collected a group of stock organisms which have been isolated from the local lesions in patients with hypostatic dermatitis. The organisms commonly found are the different forms of staphylococci, both hemolytic and non-hemolytic, Streptococcus faecalis and other streptococci, numbers of the colon-typhoid group of gram-negative bacilli. Bacillus proteus, bacillus pyocyaneus, and so forth. A surprising number of patients, when routinely tested with the stock organisms thus obtained, have proved to be quite sensitive to them.

The patients who were sensitive chiefly to the gram-negative rods proved on treatment to be more difficult to manage than those who were sensitive chiefly to cocci. The idea occurred to us that possibly this fact was due to the absorption in these patients of similar bacterial products from the intestinal tract, producing stimulation to the local lesions from this internal source.

We have attempted to vaccinate them with the organisms to which they were found to be sensitive. We used a detoxified vaccine. We found the ordinary vaccine killed by hydrochloric acid or by heat in the usual fashion was, in the first place poorly tolerated, frequently inflamed the local lesions, and was sometimes responsible for a generalized "id" reaction. However, if the vaccine was detoxified, and the detoxification process is dependent, of course, upon the type of organism being dealt with, it is much more readily tolerated, and our incidence of reactions from the systemic and local standpoints was lessened.

In the individuals in whom we felt that causative organisms might be in foci other than the intestinal tract, the foci were removed, the organisms obtained for skin tests, and in a surprising number of these, sensitization existed. These organisms were included with the stock organisms to which they had reacted, and the pooled material was given as vaccine. In the patients in whom sensitization to stock gram-negative bacilli was demonstrated, the stool was cultured and the organisms obtained were prepared for skin tests. All of the organisms which gave positive skin tests were included in the pool for vaccination. It was our experience that the offending organisms were more regularly bacteria than fungi, although in some instances fungi were found. In those cases we usually found evidence of fungus infection elsewhere, on the feet, the groin, or some other site.

Another point that should be emphasized is more frequent use of the biopsy in patients with so-called stasis dermatitis or stasis eczema, particularly in cases in existence for a considerable interval presenting lichenified areas that have been manipulated both mechanically and chemically for some time. A fair number of these will prove to be psoriasis, hypertrophic lichen planus, localized amyloidosis, or localized myxedema.

Then there is the problem, as Dr. Callaway says, of a proper approach in handling the patient. Hospitaliza-

tion is ideal. Today, at least here in Cincinnati, the use of hospital beds for patients with chronic conditions of this type is nearly impossible. As a consequence, some form of ambulatory approach is desirable. One of our surgeons in Cincinnati, Dr. William A. Altemeier, got the idea from looking at these ulcerations that the appearance of the tissue was anemic, cyanotic, and that there was locally in the ulcerated areas a definite oxygen lack. With that in mind he attempted to experiment with certain of the oxygen-releasing agents for local application, with the idea of increasing the local oxygen content of the ulcerated area.

He investigated a combination of zinc and calcium peroxide in ointment form, which applied locally in a very few days produces a tremendous change in the ulcerated area. The area becomes quite red, and the sloughing, if the base is dirty, cleans up rapidly.

Dr. Altemeier has found that urea-peroxide is perhaps a better agent. We have also used chlorophyl in the same way for the last two or three months. I feel that it is definitely less active than urea-peroxide or the zinc and calcium peroxide mixture.

With the application of these agents and some supportive procedure to the circulation, either of the bandage or stocking type, the ulceration often may be cleaned up and the patient prepared for vascular surgery without hospitalization and without being away from work.

The follow-up care and control of dermatophytosis and other infections is of extreme importance.

Dr. O. Hazel, Oklahoma City, Okla.—Many times this condition occurs in older people, people who still have responsibilities and who have been able with the usual management but with great difficulty to carry on.

It occurred to me one day as I was in the physiotherapy ward of an Army hospital with beautiful and expensive equipment, that the whirlpool bath used by orthopedists might have an application in dermatology.

I got permission to use one of these whirlpool baths for this condition. A hot boric acid solution, as warm as could be tolerated by the individual, was used and the patient put his feet in the whirlpool bath thirty minutes a day every day for a week, and two or three times a week after that.

This may have been beneficial in one of several ways: first by the cleansing of the skin and the deeper ulcers, and secondly, by improving the vacular tone and the muscle tone in these dependent portions.

The pathology of these conditions may be based partly on edema and poor circulation, and also on cellular infiltration in chronic stasis.

Last week in Chicago I heard Dr. Horton, of the Mayo Clinic, talk on the use of intravenous histamine by the drip method for such conditions as acute deafness in Meniere's disease, for sudden blindness, and for acute cases of multiple sclerosis. He had used histamine for a large number of conditions for which we have no satisfactory therapy.

Dr. Horton and his co-workers feel that in certain vascular diseases, the intravenous use of histamine by the drip method may find its place in our armamentarium. Perhaps stasis dermatitis may be added to the number of diseases in which histamine may have a beneficial effect.

Dr. Edwin E. Barksdale, Danville, Va.—Since Dr. Callaway has brought up the question of atabrine dermatitis, I would like to mention briefly our experience with it.

We have just completed an investigation upon some hundred-odd cases which until recently have been a military secret. A paper on them is now in the process of being prepared for publication. Stasis eczema is frequently a part of atabrine dermatitis. We invariably in our proven cases have had atabrine dermatitis of the skin with this condition.

When we started this investigation we decided not to make a diagnosis of atabrine dermatitis unless the clinical picture was reproducible by atabrine itself. Any number of cases sent back fall into this group.

In our investigation, in cases of stasis eczema only, we have not been able to prove atabrine to be the cause. Stasis eczema does appear in the cases of atabrine eczema but not alone. These cases start as an urticarial or heat type of rash, then go into an exfoliative dermatitis, then a patchy eczema complicated by pigmentation and atrophy.

The disease, in every case which we have been able to reproduce by giving atabrine, has been in that category and is not limited to true static eczema, as we see it. Pigmentation has been marked in all the cases of atabrine dermatitis that we have seen.

The pigmentation has been the most troublesome part of the true cases, because most of it is on the face and it is particularly prominent around the eyelids. It is a cosmetic problem.

Some of you may recall that Schwartz reported a group of vitiligo due to a detoxin used in the artificial rubber industry. He was able to feed the substance to black pigs and turn them white. After a conversation with Schwartz we decided to try some of this substance, which is put out by the Goodyear Rubber Company, to discolor the pigmented areas. It can be done. Treatment is by local application, not by oral ingestion. We have bleeched the pigmented areas to the color of normal skin by local applications. If you use too much, the skin will turn perfectly white, and we are just as bad off as we were before treatment.

I disapprove of the term, "atypical lichen planus," as applied to atabrine dermatitis, or what we think we have been able to prove to be atabrine dermatitis. It has none of the gross or microscopic characteristics of lichen planus. The term is a poor one.

By the time these men get back into civilian life, the problem will be cosmetic, in the form of atrophy and pigmentation, and many of them will have a marked increase in sweating.

Dr. Dudley C. Smith, Charlottesville, Va.—It has been suggested that stasis dermatitis with the edema and infection that go with it may be a source of focal infection.

Stasis dermatitis of the legs is a fairly frequent source of focal infection. From it we get not only toxic erythemas and other skin lesions, but general symptoms like arthritis.

Dr. Thomas W. Murrell, Jr., Richmond, Va.—I have been interested in this problem, because overseas I saw a number of patients who had been treated in this country with vascular surgery of different sorts, and also by dermatologists. Many of these require treatment of deformities of the arches of their feet, particularly those with severe pes planus and obesity. A patient with stasis dermatitis above the ankle is often helped by orthopedic consultation. The application of well fitting arch supports when indicated apparently improves circulation. Therapy for obesity, as pointed out by Dr. Callaway, should be used where needed, no matter what other forms of treatment are employed.

Dermatitis hypostatica was not uncommon in the army and unfortunately seemed to occur frequently among high ranking officers.

If we consider the improved circulation brought about by arch supports to a foot with pes planus and eversion, orthopedic help seems logical.

Dr. Francis A. Ellis, Baltimore, Md.—One can develop id-like reactions not only from bacterial and fungus infections, but also from the inflammatory products of the skin as the so-called keratids of Dr. Hopkins and Burky (Archives of Dermatology and Syphilology, 49:127, 1944). This type of reaction frequently occurs in severe cases of contact dermatitis.

Dicoumarin (Bramble, Archives of Surgery, 50:137, 1945) has been used in the treatment of stasis ulcers where there is an increase in the prothrombin time. It aids in healing the ulcer and relieving pain. Recently, we have tried dicoumarin in patients with stasis dermatitis but the results have been disappointing.

Dr. Joseph M. Hitch, Raleigh, N. C.—The so-called tropical ulcers of which I saw a fair number in the South Pacific area, are quite a problem. Since they are notoriously chronic I cast around for something that might hasten healing and finally used almost routinely an ointment containing zinc peroxide, sulfanilamide, and urea. My reasoning was based on the repeated finding of a very hemolytic and anaerobic streptococcus in the ulcers. I thought the presence of oxygen would reduce growth of the bacteria. Whatever the reason, this medication seemed to be somewhat superior to the others tried. It did not occur to me that increasing the oxygen supply to the tissues might be the efficacious factor.

I have seen three or four cases of atabrine eruption and I agree with Dr. Barksdale that there is little chance of its confusion with stasis eczema.

VIRUS STOMATITIS AND VIRUS DIARRHEA OF INFANTS AND YOUNG CHILDREN*

By G. JOHN BUDDINGH, M.D.
Nashville, Tennessee

A virus etiology has been demonstrated for at least two of the several clinical types of stomatitis encountered during infancy and childhood. The investigations of Dodd, Johnston and Buddingh[1] were the first to determine that primary herpetic stomatitis should be considered as a separate clinical entity. In this disease the mucous membranes within the mouth are the chief sites in which the virus localizes and produces pathological manifestations, and it apparently represents the first infection of the individual with the virus of herpes simplex.

The other type of stomatitis in which a virus has been found to be the etiological agent has been recently described by Buddingh and Dodd.[2] Although involvement of the mucous membranes of the mouth is one of the manifestations of infection by this agent, diarrhea is in the majority of instances a prominent feature and constitutes by far the most important problem this disease presents in young infants. In ten epidemics of so-called "epidemic diarrhea of the newborn" in hospital nurseries this virus has been found to be the etiological agent.

These two virus diseases, primary herpetic stomatitis and what for lack of a better term may be referred to as stomatitis and diarrhea of infants will constitute the subject matter of the following discussion.

PRIMARY HERPETIC STOMATITIS

Primary herpetic stomatitis accounts for the majority of cases of so-called aphthous stomatitis. Occurring most frequently during the period from six months to five years of age, it represents the initial infection with the virus of herpes simplex. The mucous membranes

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*From the Department of Pathology and Bacteriology, Vanderbilt University School of Medicine.

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within the mouth constitute the chief site of localization by the virus. Varying numbers of focal vesicular lesions develop within the mouth either concurrently with or after a short prodromal stage characterized by a sudden onset of fever, generalized malaise, irritability and loss of appetite. The scattered vesicles occur most commonly on the tongue, the inner surfaces of the lips and cheeks and the gums. Less frequently the soft palate, posterior pharyngeal wall, tonsils, larynx and outer lips are the site of these lesions. The vesicles rapidly become firm papules with ulcerated surfaces covered with a yellowish-white membrane. Pain and discomfort are prominent at this stage. Marked redness and swelling of the gums which have a ready tendency to bleed are almost invariable accompaniments. The disease tends to be self-limited and lasts from several days to two weeks.

Swabbings collected from the surface of these focal lesions inoculated onto the scarified corneas of rabbits induce typical herpetic keratitis. The nature of the infectious agent can be determined from appropriately stained sections prepared from infected corneas removed from rabbits sacrificed 48 to 72 hours following inoculation. Intranuclear inclusions within the corneal epithelial cells which may be considered as morphologically pathognomonic of the virus of herpes simplex are readily demonstrated. Furthermore, rabbits recovered from the infection can subsequently be proven to be immune to re-infection with known strains of the virus of herpes simplex.

Further proof of the assumption that this disease constitutes a primary infection was advanced by Burnet and Williams.[3] They were able to demonstrate that specific neutralizing antibodies to the virus of herpes simplex were not present in the serum of infants before an attack or during the acute stage of primary herpetic stomatitis. During the course and convalescence of the disease the development of these antibodies in high titer was readily demonstrated. Using the methods described by these investigators we have been able to substantiate their findings. An analysis of 14 cases of primary herpetic stomatitis revealed the absence of neutralizing antibodies in the serum obtained during the acute stage of the disease and their presence in high titer in the convalescent stage.

STOMATITIS AND DIARRHEA OF INFANTS AND EPIDEMIC DIARRHEA OF THE NEWBORN

CLINICAL FINDINGS

In contrast to primary herpetic stomatitis the disease caused by the virus of stomatitis and diarrhea has its highest incidence in the younger group under six months of age. Although at first encountered as a stomatitis, it was soon recognized that diarrhea is a frequent and often a more serious manifestation of this infection.

Infants and children over seven months of age with this infection are most likely to manifest only the stomatitis. The disease usually has a sudden onset with irritability and refusal of feedings. The earliest stages are characterized by the appearance of a fine vesicular eruption along the anterior border of the tip and on the under surface of the tongue and occasionally the gums and inner surfaces of the lips. The vesicles disappear within twelve to twenty-four hours leaving a bright red excoriated surface which tends to bleed readily. The gums become swollen and hyperemic. There is little if any elevation of temperature. The stomatitis persists from seven to fourteen days showing a tendency to exacerbations and remissions over two to three-day periods. It is a self-limiting disease. Therapy in the form of topical application of gentian violet and the administration of sulfonamides has been found to have no effect on the course of the infection.

Healthy infants from two weeks to six months of age who succumb to this disease are much more likely to exhibit a moderate diarrhea as the outstanding symptom. Stomatitis is present in the majority of these cases but is often overlooked. The diarrhea usually consists of from four to eight large, greenish-yellow stools a day which occasionally contain flecks of bright red blood. The majority of these infants show relatively little evidence of illness. They continue to take feedings regularly and gain weight satisfactorily. The disease has been found to continue from four to ten days. In this age group it also appears to be self-limiting. Treatment with sulfonamide drugs has thus far proven to be ineffectual in altering the course of the disease.

When this infection occurs in infants in the nursery, epidemics of the so-called "diarrhea of

the newborn"[4] are prone to develop. Diarrhea is the outstanding feature in this disease. Its severity has varied greatly in different epidemics. In the five epidemics which have been encountered at Vanderbilt Hospital since October 1943, the disease has been mild except where it has occurred in premature infants. Of thirty-three cases occurring in full-term infants under two weeks of age, there has been one death. Of eight prematures with the disease three have died. Although exact figures are not available on three epidemics in which material was sent for study by Dr. Katharine Dodd from Cincinnati, in at least one of these the mortality rate was estimated to be as high as fifty per cent. One epidemic of this type occurring at the Nashville General Hospital was found to be due to this virus. From material obtained from one case from an epidemic in a Boston nursery the virus also was isolated and identified.

In the nursery epidemics the diarrhea usually manifests itself by the daily occurrence of from four to twelve loose, greenish-yellow stools composed largely of mucus. Flecks of bright red blood are occasionally seen. Full term infants are not likely to be severely affected, but those with intercurrent infections and prematures develop dehydration and acidosis requiring treatment by a period of starvation and the administration of parenteral fluids. In the milder cases the diarrhea lasts from four to ten days. In severe cases the diarrhea may persist with remissions and exacerbations for several weeks. In fatal cases death may take place at any time during the disease. A mild stomatitis or glossitis is present in about three-fourths of cases of diarrhea of the newborn. Careful examination is often required to detect the slight excoriation of the anterior margin and tip of the tongue. Swelling and redness of the gums may or may not be present.

Some adults are apparently susceptible to infection with the virus of this disease, especially under circumstances where they are in close contact with infected infants. Thus nine cases of stomatitis in adults, interns, medical students and nurses associated with the nursery during epidemics have been encountered. Another case in an adult was acquired as the result of accidental inoculation with a Berkefeld V filtrate from passage material in rabbit corneas. In none of these has diarrhea occurred. Such individuals can and have been proved to be responsible for the spread of the disease, especially since the infection in the mouths of adults tends to chronicity, persisting from at least two or three weeks to six months.

Thus it is seen that this disease has at least three clinical manifestations: diarrhea; stomatitis and diarrhea; and stomatitis alone. The age factor seems largely to be responsible for the differences in the clinical symptoms. As will be mentioned later, other forms of this disease, at least in adults, may exist and may represent the original source of the infection. In one hundred and thirty-two cases from which the virus has been isolated and studied at Vanderbilt Hospital since July, 1942, the clinical symptoms of diarrhea, stomatitis and diarrhea or stomatitis alone have shown a distribution in the various age groups as represented in *Table 1.*

ISOLATION AND IDENTIFICATION OF THE CAUSATIVE AGENT

Since this disease was first encountered clinically as a stomatitis, the possibility that it represented an atypical form of primary herpetic stomatitis was considered. Inoculation of mouth swabbings onto scarified rabbit corneas did not result in the keratitis typically produced by the virus of herpes simplex. A reaction, however, did develop which has been found to be character-

AGE DISTRIBUTION, CLINICAL SYMPTOMS AND MORTALITY IN VIRUS STOMATITIS AND DIARRHEA AT VANDERBILT HOSPITAL, JUNE 1942 TO SEPTEMBER 1945

Age Group	Symptoms* S.	D.	S-D	Total	Per Cent Total	Deaths
Prematures	0	6	2	8	6.6	3
Under 2 wks.	1	11	21	33	25.	1
2 wks. to 6 mos.	15	18	33	66	50.	2
7 mos. to 1 yr.	9	0	2	11	8.3	0
2 yrs. to 6 yrs.	3	0	0	3	2.2	0
6 yrs. to 15 yrs.	1	0	0	1	.7	0
Adults	10	0	0	10	7.5	0
Total	39	35	58	132	100	6

* S=Stomatitis only.
D=Diarrhea only.
S-D=Stomatitis and diarrhea.

Table 1

istically associated with this disease. After inoculation of the scarified cornea of rabbits, either with swabbings obtained from mouth lesions or with small amounts of stool from cases of diarrhea, a definite haziness with cloudy opacity along the lines of scarification in the cornea develops within twenty-four hours. Marked hyperemia and swelling of the palpebral conjunctivae also is present. In many instances an intense iritis develops. This reaction persists for forty-eight hours and then rapidly disappears leaving a normal looking eye except for slight opacities along the lines of deeper scarification. Considerable experience with control material obtained from mouth swabbings and stools from normal individuals, swabbings from infants with thrush and other varieties of mouth lesions as well as stools from cases of dysentery indicates that the corneal reaction as described may be considered indicative of the presence of the etiologic agent of this disease. Moreover, the development of specific immunity to reinfection in the test animals can be demonstrated by challenge inoculations with known strains of the agent propagated in rabbit corneas in serial passage or with infective material from the mouths or stools of patients with the disease. Complete immunity develops in rabbit eyes in about three weeks.

Strains of the agent have been maintained by serial passage from cornea to cornea by transfer of ground infected corneal suspensions at forty-eight hour intervals. Young rabbits from six to twelve weeks of age have been found to be most satisfactory for propagation of the agent in series.

The agent has proven to be readily filterable through Berkefeld V candles. More exact determinations as to the approximate size and nature of this virus await further study.

Specific neutralizing antibodies to this virus can be demonstrated in the serum of rabbits immunized by repeated intravenous injection with infected corneal suspensions. Analysis of the acute and convalescent serum samples of sixteen patients has demonstrated that specific neutralizing antibodies develop during the course and convalescence of the disease. Quantitative determination of infectivity titres and serum antibody levels have not succeeded because of the fact that inoculation of scarified rabbit corneas with dilutions of infective material or serum-virus mixtures are difficult to control.

Attempts to propagate the virus or produce infection in rabbit skin; guinea pig skin; in young mice by intraperitoneal, intracerebral inoculation or by feeding have proven unsuccessful. Developing chick embryos have also not proven to be useful in this regard. Diarrhea, in which the virus can be recovered from the intestinal contents, can be produced occasionally in four to six weeks old rabbits four to six days following the feeding of suspensions of virus from infected corneas or stool suspensions from infants with the disease. Local reactions can also be elicited following scarification or intracutaneous inoculation of guinea pig foot pads. Propagation in series in this tissue has not succeeded.

PATHOLOGICAL FINDINGS

Microscopic sections of rabbit corneas fixed at twenty-four and forty-eight-hour periods following inoculation either with materials from patients or with passage virus show focal accumulations of polymorphonuclear phagocytes of varying extent and intensity throughout the substantia propria. These foci are centered around and directly beneath focal areas of necrosis of corneal epithelium. The lines of scarification which presumably constitute the points of entry of the infectious agent are the usual sites at which epithelial ulcerations are found. In severe involvement the entire corneal epithelium has been destroyed. There seems to be little if any tendency toward focal epithelial proliferation. No intracytoplasmic or intranuclear inclusion bodies have thus far been observed. The inner mesothelial lining of the cornea is often separated from its basement membrane and the intervening space is filled with polymorphonuclear exudate. When iritis exists there is intense congestion of the blood vessels, marked edema and infiltration with small numbers of polymorphonuclears.

Guinea pig foot pads inoculated either by rubbing infectious material into light scarifications or by intradermal inoculation develop intense hyperemia and moderate edema. Necrosis of epithelium along the lines of scarification or along the needle tract can readily be observed. The reaction persists for forty-eight to seventy-

two hours and then rapidly disappears. No generalized lesions are observed. Microscopically the reaction is characterized by necrosis of the epithelial cells in the immediate vicinity of the inoculation around which an intense polymorphonuclear inflammatory exudate collects. Hyperemia and edema of the underlying tissues also are evident.

In the occasional young rabbit in which diarrhea can be produced following the feeding of infected corneal suspension or stool suspensions from infants with the disease, the pathological changes appear to be limited to the jejunum and ileum. These portions of the gut are distended with intestinal contents consisting largely of mucus. Scattered throughout the mucosa at irregular intervals with no definite relation to lymphoid tissues or other structures are numerous pin-point to pin-head sized areas of hyperemia or hemorrhage. Slight superficial ulceration of the epithelium over these areas is frequently observed. Microscopically focal epithelial ulcerations are in evidence and an acute inflammatory reaction is present in the immediately adjacent submucosa. Intense hyperemia and moderate edema of the submucosa is found throughout the jejunum and ileum. The lymphoid tissue shows no involvement.

Four of the six fatalities in infants with diarrhea in this hospital have been autopsied. Typical reactions in rabbit corneas have been obtained with intestinal contents from each case. From one case inoculations were also made with heart blood, cerebrospinal fluid, suspensions of jejunal and ileal mucosa, brain, cardiac muscle and mesenteric lymph nodes. Besides the intestinal contents, positive corneal reactions were obtained only with the ground suspension of intestinal mucosa and mesenteric lymph node.

Gross pathological changes associated with this disease are primarily found in the small intestine. The intestinal contents are watery, greenish-yellow in color, and show an abnormally great amount of mucus. The mucosa of the jejunum and ileum is swollen and presents irregularly scattered small areas of hyperemia and pin-point sized superficial hemorrhages. The centers of these hemorrhagic areas upon close inspection frequently show small shallow ulcerations. These lesions are confined to the jejunum and ileum and do not appear to be distributed with any regularity in association with lymph follicles or other anatomical landmarks. The regional mesenteric nodes are swollen and edematous but no evidence of inflammation or necrosis is present.

The tongue lesions from one case in which stomatitis was present at autopsy have been studied microscopically. Focal necrosis of the squamous epithelium is found. An intense inflammatory reaction, consisting chiefly of polymorphonuclear leukocytes is present adjacent to and underlying the areas of focal ulceration. No definitely specific characteristics can be attributed to the tongue lesions.

The lesions occurring in the jejunum and ileum also are of a non-specific character upon microscopic examination. There is a generalized marked edema and congestion of the submucosa. The mucosal epithelium contains numerous scattered minute foci of necrosis often involving only a few cells. Occasional polymorphonuclears are quite generally encountered in between the mucosal epithelial cells. Mitotic figures are present in abundance. Where mucosal ulcerations are somewhat more extensive a thin layer consisting of extravasated red blood cells, fibrin, and a few polymorphonuclears is present on the denuded surface. A small number of polymorphonuclears are quite generally scattered throughout the submucosa. No gross or microscopic lesions have been observed in the colon in the four cases which have been studied.

METHODS OF SPREAD AND POSSIBLE ORIGINAL SOURCE OF THE INFECTIOUS AGENT

In the original communication regarding this disease the presence of the virus either in conjunction with clinical stomatitis or without evidences of infection in the mouths of adults in close contact with or attending infants during an epidemic was reported.[2] Evidence was obtained to indicate that under these circumstances such individuals usually constitute the chief source by which the disease spreads and the epidemics are maintained over long periods of time. Only through detection of such individuals by rabbit corneal inoculation of mouth swabbings from all personnel, nurses, doctors and interns associated with the nursery as well as by strict isolation of the affected infants could an epidemic be promptly halted. To account for sporadic cases which occur during inter-

epidemic periods and for the first case which occurs in a nursery epidemic is much more difficult. During the past two years the origin of epidemics could not be accounted for by the transmission of the virus from the mouth of adults to infants in the nursery. Since the first case in an epidemic has frequently been found to begin in a newborn on the fourth day of life, the time which has been found to be the usual incubation period of the disease, it was suggested by Dr. Katharine Dodd that the disease could possibly be acquired by the infant from the mother during passage through the birth canal. That this is very probably the case became apparent when the virus was isolated and identified by cross-protection tests in rabbit corneas from the swabbings obtained from the vagina of the mother of an infant which developed the diarrhea on the fourth day after birth. Material from the mother and baby in this case were sent by Dr. Dodd from Cincinnati by air mail. No observations or studies have as yet been made as to whether the virus produces clinical manifestations of infection or is harbored asymptomatically in the female genital tract.

Indications have also been obtained that this virus may be the causative agent of infection in the genital tract and other sites in adult males. In the case of a man who suffered from what is clinically designated as "Reiter's disease"[5,6] the virus has been isolated by rabbit corneal inoculations with swabbings obtained from the urethral discharge, the conjunctivae and the mouth. Subsequent "challenge" re-inoculation with a strain of virus derived from cases of infant stomatitis and diarrhea indicated that a similar or at least closely related virus had been isolated. This patient presented the classical triad of symptoms associated with Reiter's disease, urethritis, migratory arthritis and conjunctivitis. He also had a severe balanitis, stomatitis and zosterlike eruption over both buttocks. At the time the virus was isolated the urethritis, conjunctivitis and arthritis had been present for three months. He recovered spontaneously within about six months after the onset of his disease.

DISCUSSION

Because this report is concerned with stomatitis of infants of virus etiology, mention was also made of primary herpetic stomatitis. A discussion of this disease and its broader implications has recently been presented by Burnet.[7] The chief concern of this discussion has been to present evidence that a different type of stomatitis is encountered in infants from which a hitherto unrecognized virus has been isolated. Of greater significance is the fact that evidence has accumulated that this virus also can bring about infection of the small intestine of infants with a resulting diarrhea. When this infection becomes established in the newborn in nurseries, epidemics of "epidemic diarrhea of the newborn" are likely to result.

The identification of the virus of stomatitis and diarrhea as the etiological agent of epidemic diarrhea of the newborn has provided information which should lead to effective control measures for nursery epidemics of this disease. In the first place the strictest isolation technics directed toward prevention of spread of the agent by means of hands, utensils, toilet articles, nipples, are imperative. These measures, however, are inadequate due to the fact that some of the adult attendants, nurses and other personnel may acquire infection with the virus and develop a stomatitis which may persist from two weeks to several months and serve as sources of infection. Occasional adults also may become temporary asymptomatic carriers of the virus. Therefore, it is unlikely that a nursery epidemic will be controlled quickly and effectively unless all personnel connected with it are subjected to a search for the virus by the inoculation of mouth swabs onto rabbit corneas. All individuals found to have stomatitis or to be asymptomatic carriers should be removed from the nursery until proved to be free of the virus. These measures have proven to be effective in eradicating the disease quickly in its epidemic form in nurseries.

The indications presented from single cases in which this same virus has been isolated and identified from the adult female genital tract and from the male in a case of Reiter's disease emphasizes the complexity of the problem this infectious disease presents and the need for further widespread investigation. That this virus may produce various, as yet poorly defined, clinical manifestations in the adult is a distinct

possibility. The probability that it may be acquired, transmitted and maintained venereally in adults and thus serve as the original source of epidemics of diarrhea of the newborn must be entertained until definitely proven or disproven. Not only the severe manifestations such as Reiter's syndrome, but the so-called non-specific urethritis in males and non-specific cervicitis in females should be investigated with this probability in mind.

Investigations into the nature, properties and behavior of this virus are in progress. These will be reported when sufficient and acceptable data and observations have been accumulated.

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DISCUSSION (*Abstract*)

Dr. Katharine Dodd, Cincinnati, Ohio.—As Dr. Buddingh has said, he first inoculated the rabbit's cornea with swabs obtained from children in the outpatient department who had a mild stomatitis. Later when we had an epidemic of diarrhea in the newborn nursery at Vanderbilt he used swabs from the mouths of the infants and from the rectum or from the stool after it had been passed. When I came to Cincinnati, Dr. Ruchman, who was working in Dr. Sabin's department, very kindly consented to carry on the investigation here. The work with animals which I am reporting today has all been done by Dr. Ruchman.

We have had in the two years that I have been in Cincinnati three epidemics of diarrhea of the newborn as a result of which infants have been admitted to the Children's Hospital. In January, 1945, during an epidemic at another hospital, two desperately ill infants received treatment at this hospital. A swab taken from the stool of one gave the typical reaction when inoculated on a rabbit's cornea. In a second epidemic, fourteen children came to our infants' ward from one hospital and five other children similarly affected with diarrhea were admitted from other hospitals in the city or in the vicinity. We tested eight children in the usual manner for the presence of an agent which would produce a lesion on the scarified cornea of a rabbit and in six instances obtained positive results. The deaths among the children seen by us in this epidemic were nine, or approximately one-half of the children affected. The third epidemic concerned five infants. Four were tested. On these four we obtained two positives and one negative. We sent swabs to Dr. Buddingh and he obtained a positive result where we had had a negative, but failed to confirm our positive result in one instance.

An epidemic of diarrhea which concerned practically every infant in the nursery occurred among the premature infants at the Cincinnati General Hospital. In four of eight infants tested we obtained positive results. Dr. Buddingh tested six infants and obtained positive results in all six. Since two of the children from whom we had failed to get a positive result were found by him to be a positive, in one place or another, positive results were obtained from all eight infants. Again the death rate of the affected infants was approximately fifty per cent.

Three mild epidemics of diarrhea have occurred in the newborn nursery at Cincinnati General Hospital. In each instance the diarrhea began on the third day of life and the affected children were not necessarily in close contact with each other. One of the epidemics occurred at the same time as the epidemic which proved fatal to the premature infants. The premature infants are born in the same delivery room as the full term children but are sent from there to a separate nursery and cared for by entirely different personnel except for one house officer who works on both services. We thought that it was possible that the infection of the infants might be acquired, as thrush and inclusion blenorrhea are, in passage through the mother's birth canal. When an infant became ill we obtained for inoculation swabbings from the mothers' vaginas as well as from the infants' mouths and stools. Some of the inoculations were again done in duplicate by us and Dr. Buddingh. This time ten mothers and infants were tested. Seven of the infants' stools gave positive results for one investigation or the other or both. Eight of the vaginal swabs gave a positive reaction on the rabbit's cornea. The results suggest that infants may during passage through the birth canal become infected with an agent capable of causing diarrhea, after a short incubation period.

During these last two years other scattered cases of diarrhea or stomatitis or both have been seen in the infants' ward and have been shown either by us or by Dr. Buddingh or both of us, to be harboring the infectious agent we had been working on.

In a severe epidemic of diarrhea in older infants which occurred this last year, Dr. Buddingh found all the cases positive but Dr. Ruchman and I were able to obtain but two positives. In both of these routine stool cultures grew out pathogenic organisms, one a Proteus morganii and the other a dysentery bacillus.

In another epidemic of diarrhea neither Dr. Buddingh nor Dr. Ruchman could obtain any evidence of the presence of a virus but here in Cincinnati we cultivated Flexner dysentery bacillus on a rabbit's cornea in one

instance, and Proteus morganii in another. We have now produced lesions on the rabbit's cornea from several organisms, sometimes obtained from stools and sometimes from direct culture. All strains of the organisms will not infect the cornea but at times dysentery bacilli, Proteus morganii, atypical colon bacilli and a strain of Pasteurella will. Dr. Ruchman, as well as other investigators, has also produced lesions with herpes virus, vaccinia, Toxoplasma, B virus, pseudorabies, and Eastern and Western equine encephalomyelitis virus. Some of the lesions produced have specific characteristics and can easily be recognized pathologically; others are non-specific as is that produced by the filterable agent of mucous diarrhea.

As yet in Cincinnati we have not been able to produce a lesion on a rabbit's cornea by transfer from an infected cornea nor have we been able to demonstrate immunity to reinoculation in a previously infected rabbit. I have no doubt that Dr. Buddingh has discovered a hitherto unrecognized filterable agent which causes diarrhea and stomatitis in infants but we are yet a long way from being able to prove whether or not this is the chief cause of diarrhea of the newborn and of many of the diarrheas of older infants. I hope that he will be able to find a better medium than the rabbit's cornea for inoculation and growth of the virus.

Dr. C. M. Pounders, Oklahoma City, Okla.—I should like to ask about the usual course of this stomatitis that comes from the virus, if there is any satisfactory treatment for it, and do the cases that have stomatitis often develop diarrhea later?

Also does recovery from this disease seem to produce immunity? Particularly does recovery from the stomatitis seem to make the child immune to the diarrhea?

Dr. A. Sabin, Cincinnati, Ohio.—Dr. Buddingh has presented a very difficult piece of work and as an individual who is interested in the identification of viruses, I can sympathize with his difficult problem. It is difficult because it seems to be an agent which produces very limited effects.

Dr. Buddingh did not discuss in detail the relationship of this agent to certain known viruses. There is an agent known as vesicular stomatitis virus of horses and cattle, which was first isolated by inoculation of the pads of guinea pigs. Only after a good deal of difficulty in adaptation was it established in the brains of mice.

I wondered if Dr. Buddingh has had an opportunity to do any cross-immunity or other tests to indicate whether or not there is a relationship between this virus of animals and the one of the human beings studied.

Also I should be very much interested to know whether or not Dr. Buddingh went through the laborious effort of sectioning the rabbit corneas to determine whether or not intranuclear or cytoplasmic inclusion were present to rule out other viruses, and whether passage and immunity tests with an established strain of the human stomatitis virus were carried out in each instance before the test for this virus was stated to be positive.

Dr. Buddingh (closing).—I realize how difficult it sometimes is to judge whether these reactions are positive or negative in the rabbit cornea. I wish there were another tissue or another animal in which this particular agent could be propagated with greater ease and with some greater specificity. Until now I have not been able to do this. Inoculation af various animals has thus far failed. One-week-old mice, inoculated by mouth, intraperitoneally or intracerebrally have all turned out to be negative.

That one can be confused by bacterial infections is also well recognized, but usually bacterial ophthalmitis in rabbit corneas occurs later than the reaction which develops from this agent. A severe reaction from bacterial infection develops in the cornea usually about the third or fourth day. At this time the reaction produced by the virus has disappeared.

It is rather difficult to explain the differences in results in some of the positive and negative cases which were sent to me from Cincinnati. The cases which turned out to be positive are probably due to the virus. Again, as can be imagined, it takes a fair amount of experience to be able to recognize and evaluate the reactions which develop. It was more than two years before we felt reasonably certain that we had something definitely different and hitherto unrecognized.

In reference to Dr. Pounder's question as to the course of the stomatitis: most of the children, particularly healthy newborns and older infants, have a stomatitis which will last for seven to ten days and then disappear. Nevertheless, one encounters cases particularly in infants who have intercurrent infections, of prematures which tend to recurrences. The reaction in the mouth will wax and wane over a period of two or three days, disappearing and then becoming more severe. Some instances in which these infants had a stomatitis for as long as three or four months before they cleared up have been observed.

No specific treatment has been found for this infection. Many of the cases, especially in the older groups, which begin as stomatitis also develop a diarrhea. After having had stomatitis for three or four days, a diarrhea develops which usually is not so severe as that found in the younger children who have the so-called epidemic diarrhea of the newborn.

No recurrences have been found in our series of cases. Apparently, so far as we can tell at the present time, an immunity to reinfection is established in these infants.

As far as Dr. Sabin's remarks are concerned, I appreciate his way of stating the problem because I am sure he also recognizes the difficulties in working with viruses regarding which little is as yet known.

I have been intrigued by the idea that this might be a variant of or a virus very much like the virus of vesicular stomatitis of horses or of foot and mouth disease of cattle. The fact that the reaction obtained in guinea pig foot-pads is not unlike that produced by

foot and mouth virus is, to say the least, suggestive. Nevertheless, it certainly is not so virulent, in that generalized lesions in the guinea pig have not been observed. Neither have I had any opportunity to do cross-immunity experiments with other viruses except herpes simplex. I should like to do this in the future.

In the great majority of these cases the rabbits have been subjected to a challenge inoculation with stock strains of the virus. They have all proven to be immune. Following challenge inoculation with stock strains no reaction whatsoever develops provided the animal is given time to develop immunity. Reinoculations performed ten days after infection produce an accelerated type of reaction. In fact, the same experience occurred when, following reinoculation about twelve days after accidental infection in myself, a definite accelerated reaction developed. Instead of a three day's incubation period, a reaction developed within twenty-four hours and persisted for only two days very much like accelerated reactions encountered in many other virus infections.

The search for inclusions of various types has not been carried quite far enough. All I have depended upon are routine sections of cornea. It is a very good suggestion that some of these corneas be subjected to serial sectioning to be absolutely sure that no inclusions are present. However, a series of investigations on hourly removal of corneas after infection has not shown much to suggest that inclusion bodies occur in this virus infection.

WHAT IS WRONG WITH THE DYSPEPTIC WHOSE FINDINGS ARE ALL NEGATIVE?*

By WALTER C. ALVAREZ, M.D.†
Rochester, Minnesota

The daily experience of the gastro-enterologist is that in the case of most of the persons who come complaining of indigestion he cannot find any organic disease to account for the indigestion or abdominal distress. Where I work the roentgenologists are constantly reporting negative findings, and I expect them to do so; I rarely question their reports because I know how efficient they are in detecting organic disease in the stomach, bowel and gallbladder. Incidentally, I am glad that when they see no organic disease they report briefly "normal digestive tract" instead of supplying me with a number of placebos of diagnosis such as ptosis, spastic colitis, adhesions, a "slowly-emptying gallbladder," or "probable chronic appendicitis" (as evidenced by the fact that the appendix pointed up or pointed down or filled or did not fill).

Certainly, in a high percentage of the cases of indigestion which he studies the gastro-enterologist must be prepared to make a diagnosis of a functional ailment. He will then say to the patient that his or her trouble is doubtless real, that there is no question about the fact that distress is being experienced, but it is not due to anything in the abdomen which at an operation the surgeon could find and cut out. That is the essential point.

The Need for Diagnosing the Exact Type of Functional Trouble Present.—Obviously, the physician does a praiseworthy thing when in the absence of organic disease in the abdomen he makes the diagnosis of a functional type of distress; but he cannot stop there. He must go on to try to find out what type of functional disease is present, and what the disturbing mechanism is. The routine giving of phenobarbital may be good treatment for some persons with nervous indigestion due to jitteriness, but obviously it is not good treatment for many others. Let us say that one woman's nervous indigestion is due to the fact that she is worn out with the care of a defective child; another's nausea and heartburn are due to her smoking too much; another's "gas" is produced by a failing heart; another's is due to her allergic reaction to certain foods, and another's trouble is practically all due to her constipation. Obviously, such persons need different types of treatment, and they will not get the right type unless the physician takes the time to go thoroughly into the story of the illness. He must not expect, as he often does, to have the whole diagnosis made for him by his laboratory technician, his roentgenologist, or some expert peerer into one of the several orifices of the body.

Now, what are the common causes of functional indigestion? In the short time available I can review briefly only the commoner ones.

The Nervous and the Relatives of the Insane.—In most cases of functional indigestion, the patient is by nature nervous, hypersensitive and

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†Division of Medicine, Mayo Clinic, Rochester, Minnesota.

overirritable. Often he or she is a pathologic worrier or fussbudget or perfectionist. Sometimes the trouble has been brought on by extra strain or overwork or long hours, but oftener, I think, it is due to a poor nervous inheritance. Many of the most nervous or psychopathic or poorly adjusted of my patients are what I call "relatives of the insane." I think this classifies them well, and explains the origin of their troubles.

To illustrate, recently a man came in and said, "As soon as I eat I go all to pieces; I get so nervous and jittery that I could jump out of my skin; the sweat runs off of me, waves of gooseflesh run up and down me, and I feel as if I might faint; as a result I am a nervous wreck for an hour or two after every meal." I asked immediately, "Have you any relatives who were nervous wrecks and who, at times, had to take refuge in a sanitarium?" "Oh, yes," he said, "four of my immediate family have been mentally upset." There, I think, was the answer to all his troubles; his nerves were playing tricks with him, and what he had was an equivalent of the insanity which appeared in several relatives. In them the defect may have been mainly in the cerebrum while in him it was mainly in some center for the autonomic nerves. Those almost unnoticed postprandial reflexes which take place in normal persons were in him so greatly exaggerated as to become distressing.

As you know, many of the persons who complain of belching have not any indigestion or true flatulence and therefore cannot be helped with any diet. They are only air-swallowers, and they swallow air because they are jittery, mentally upset, frightened, or worried. Other persons of this type, when they become panicky, perhaps with fear of losing their mind, get a short attack of diarrhea. Others bloat badly, but not with gas, as can be seen by making a roentgenogram of the abdomen. Evidently the phenomenon is produced by some disturbance in the innervation of the muscles surrounding the abdominal cavity.

The Mildly Insane.—Many gastro-enterologists would be surprised if they were to learn how many of the patients who are going through the office each month have a mild form of manic-depressive insanity. They are the persons who, when they feel well, are too active and energetic so that the mind races; they then work too hard and for too long hours; they have no self-discipline and they like to turn night into day. Perhaps, partly as a result of this, they eventually get so tired that they cannot do much; they get depressed, and have to hibernate for months or for a year or two.

Commonly, when a bit depressed, they complain bitterly of morning fatigue, loss of "pep," a feeling of intoxication and aches all over. They go to the gastro-enterologist because they and often their physicians are sure that the liver or the colon must be at fault.

The gastro-enterologist sees also those sullen, shy, reserved and somewhat schizophrenic persons who are hard to get acquainted with. He sees also the hypochondriacs who cannot be reassured or cheered up: who feel sure they have cancer or heart disease or terrible poisoning by toxins being absorbed from the colon; he sees the women who get terribly tense and unreasonable and "impossible to live with" for a week before menstruation, and he sees the women who go all to pieces after the menopause. The essential point in most of these cases is that the trouble is nearer a psychosis than an ordinary neurosis or fatigue state or "chronic nervous exhaustion."

Nervous Breakdowns.—Every gastro-enterologist should be watching out daily for persons with a "nervous breakdown." I, who am looked on as a gastro-enterologist, have to spend perhaps a third of each day taking care of persons who have broken down nervously. It is a sad fact that most of them keep going from one consultant to another telling their story in such a way that it does not seem to occur to anyone that the essential feature of their disease is not indigestion or abdominal discomfort but rather a disorganization of their cerebral functions so great that they are unable to work much if at all. Usually the doctor's assistant who takes the history does not think to ask a few highly important questions such as, "Are you working?" Often when I ask a healthy looking man how long it is since he last worked he will say that he has not done a thing for several years. When I ask, "Why not?" he will say that it is because he cannot stand being around people. If he

should try to sell some goods or interview someone he would soon get nervous and jittery, the sweat would break out on him, and he would have to excuse himself and go and lie down. A man with this type of breakdown will often admit that at times he is so overemotional that he cries. Usually he is unable to sleep restfully.

One of the best signs of a nervous breakdown is the fact that the patient cannot read much. Ask "Why not?" and he will say that in the first place, he is not much interested, and in the second, his eyes tire quickly, the lines run together and he forgets a paragraph before he has finished reading it. Another important symptom is an inability to sit through a movie; the patient soon gets tense and restless and has to leave. A woman, if she goes to church, will sit in the last pew at the back so that she can slip out if she gets too tense or tired.

Often, after a consultant has elicited these symptoms and has pointed out their great significance to his assistant, he will be disturbed to see that the young man is not impressed; because of his training he continues to feel, as does the patient, that all the troubles must be arising in the digestive tract. Great significance will be put on the report of the roentgenologist that there was perhaps a "duodenal ulcer" or a "slowly-emptying gallbladder" or adhesions or diverticulosis of the colon. Because in college the young assistant was not trained to think of the brain as a common site of disease, it does not occur to him that no disease of the abdominal organs, with the possible exception of carcinoma of the pancreas, could so demoralize a man's brain that he cannot read a few paragraphs in the daily paper. Even cancer of the stomach does not do that until perhaps the patient has been pulled down by pain, undernutrition and loss of sleep.

When the physician has decided that the patient has a nervous breakdown the next question is, How did he get it? Did he overwork enough to bring it on, or did he get it mainly because he inherited a poor nervous system? There is one question the answer to which can throw great light on this problem and that is: does the fatigue come in the morning or in the late afternoon? If it is present in the morning on waking it generally means that the patient inherited a poor nervous system, whereas if it comes in the afternoon it is commonly due to overwork.

Small Strokes.—When an older person suddenly breaks down nervously and becomes psychically changed the physician should always wonder if he or she has had a small stroke. Such strokes are common in persons past fifty years of age. They are due usually to thrombosis in a small intracranial artery, and the victim does not necessarily have to have hypertension. A strong point in the history often is that the breakdown came suddenly, usually on the morning of a certain day. Highly important is the fact, when it can be elicited, that a person who was previously active, efficient, friendly and optimistic suddenly became slowed-up, forgetful, irritable, unable to work and perhaps without interest or joy in life, family and friends. Again, the physician must recognize the fact that no disease in the abdomen could so suddenly change a person's whole personality. Sometimes there is a marked loss in memory or a marked change in the handwriting.

Usually, when stricken, the patient consults a gastro-enterologist. One reason is that when the small artery in the brain became plugged a sort of storm went down the vagus nerves to produce vomiting or uncomfortable sensations in the abdomen; the patient was thought to have "acute indigestion," whatever that is. Another reason is that there was dizziness or vertigo which was thought to be due to disease of the liver, and another reason is that after the little stroke, the patient's weight fell off markedly.

The wise old clinician will suspect cerebral arteriosclerosis the minute he sees grease spots on the coat of a cultured man, and other signs indicating a loss of proper grooming and mental health. It is highly important in these cases that the correct diagnosis be made promptly, so that the prognosis will not be too optimistic. In most cases the prognosis as to a return of health is bad, and there is no known drug that will make the patient more comfortable.

Another usually unrecognized cause for a nervous breakdown with abdominal discomfort is an attack of encephalitis, not diagnosed when it came. I see many such cases a year in which attending gastro-enterologists could easily have made the correct diagnosis if only they had sus-

pected a nervous breakdown, had noticed the lack of expression in the patient's face, had gotten the story of inability to work, and then the story of a preliminary illness with perhaps somnolence, severe headache, double vision and mental hebetude.

Constitutional inadequacy.—One of the common diseases I see every week is constitutional inadequacy, or a frailness which, throughout a lifetime, will make it hard for the patient to stand up to the strains and stresses of life. Many of the affected persons are "relatives of the insane" and one cannot hope ever to give them a new, sturdy and uncomplaining nervous system. Most of them, and the world is full of them, complain of indigestion of some kind. The best thing I know to do for them is to help them, first, to understand their problem, and second, to learn to live within their means of strength.

The Sore Colon.—One of the commonest forms of nervous indigestion is associated with a bowel that is sore and "growly" much of the time. I say "bowel" because the trouble is not limited to the colon. In these cases the patient may from time to time pass considerable amounts of mucus in the stools and the roentgenologist will report spasticity of the descending colon. These people are likely to get into trouble when they go through any emotional storm, or when they eat some food to which they are allergically sensitive, or when they are coming down with a cold, or perhaps when they let themselves get too constipated or when they take too many laxatives or bulky foods.

These persons must be taught how best to live with their colon because they will have it all their days. Fortunately they will never come to any bad end because of it. Many can be helped much by taking a daily enema of physiologic salt solution, while others need a dose of codeine before they go out to a party.

The Dyspeptic.—There are a large number of persons in this world who appear to have been born to be dyspeptics all their days, but just why, it is hard to say. Many of them have what I call "the small laboratory disease," which means that they get along fairly comfortably so long as they eat only small amounts of food. Just let them, however, overload the digestive tract and they get distress. Some of these persons may have a short bowel while others may have a flabby intestinal musculature or a poorly developed or atrophic gastro-intestinal mucosa. Others may, perhaps, have a pancreas or a liver which works inefficiently, while others may have had in childhood diphtheria or poliomyelitis or some other disease associated with a neurotoxin which destroyed some of Auerbach's plexus, and left the bowel overirritable or crampy, or inclined to allow gastric waves to run orad almost as easily as caudad, and thus to cause regurgitation, heartburn and several other types of digestive distress.

The Hypersensitive Digestive Tract.—There are many persons with nervous indigestion whose digestive tract is much too sensitive and reactive. One can easily recognize this type of tract by finding out that the minute food is put into the stomach there is a sudden cramping or bloating or a feeling as if the bowels were going to move. The fact that the distress comes quickly, and often after the drinking of a little water or "pop" shows that it cannot be due to a failure of digestion or to allergy. Probably the quick blowing up of a balloon in the stomach would have the same effect. Usually one finds this hypersensitive type of digestive tract in nervous hyperreactive persons who have markedly exaggerated knee jerks.

Indigestion Due to Poorly Cooked Food.—There are probably many persons with indigestion who get into trouble because their food is cooked badly or greasily. One thinks of the persons who have to eat in cheap restaurants or in homes kept by slatternly women. Many sensitive persons are disgusted and upset if the food is served unattractively and in unpleasant or dirty surroundings. Some will get indigestion if they fear that the food they ate was spoiled or not of good quality, or in some way likely to disagree.

Persons Who Eat Too Fast or Too Much.—When a stout person complains of indigestion for which no organic cause can be found the physician should inquire if he is eating too much. Often he is and that is his trouble. Perhaps also he eats too fast. Some of the stout persons who complain of heartburn and foul flatus are inclined to gorge themselves until the diges-

tive powers of even their strong stomach and bowel are overtaxed and overwhelmed. Then food is left to putrefy or ferment in the colon.

Indigestion Due to Eating Under Bad Circumstances.—Some irritable persons who complain of puzzling attacks of abdominal pain get into trouble because they eat while they are fighting with a spouse or while they are tense or fatigued, or still upset over some annoyance. A few can digest well only if they eat when alone; they get into trouble whenever they eat with others, and especially in a crowded restaurant. At the Mayo Clinic many patients make their diagnosis of this sort of trouble when they say,

"You know, doctor, it is curious, but during the two weeks in which I have been here I have eaten everything and I have not had a bit of the old pain and indigestion that have been bothering me so constantly."

The reason for this usually is that the patient has been at rest and has been eating while free from tension and annoyance. Many a time I have seen such a patient suddenly get a bad digestive upset, and then I have learned that it followed an unpleasant long distance telephone conversation with an abusive spouse or the receipt of a disturbing telegram.

Food Sensitiveness and Allergy.—Many of the persons suffering from indigestion, bloating, abdominal pain and much foul flatus, are allergically sensitive to one or more foods. Usually one should suspect that such food sensitiveness is at fault when the patient says that he knows that he must not drink milk, or eat eggs or some other food because it always poisons him. In such cases it is possible that there are other foods which the man has not yet learned to avoid. If the distress complained of is coming almost every day the best way for the patient to find if it is due to an offending food is to go on an elimination diet. A simple one consists of nothing but lamb and rice, butter and sugar and canned pears, to be eaten for only two days. If it does not help in that time, it is not likely to do so later. If the patient's distress comes only once in a couple of weeks he should keep a record of unusual foods eaten before each upset. If the patient says that often he goes for two or three weeks without distress the chances are that his trouble is not due to food allergy; certainly it is not due to the eating of any of the commonly used foods.

Heartburn.—A fairly common functional trouble is heartburn. When asked to show where his distress is the patient usually runs his hand up the lower half of the sternum. Many of these sufferers were born with a tendency to heartburn and they have it off and on for years. There are a number of exciting causes such as getting angry, or eating certain foods, or overeating, or smoking too much, or drinking certain liquors. Curiously, when heartburn appears in a patient with ulcer one can find that when he has hunger pain he has no heartburn and when he has heartburn he has no hunger pain.

Diarrhea.—In perhaps nine of ten cases of diarrhea I am unable to find any sign of organic disease in the digestive tract or of parasites in the stools. Many persons will admit that they have always had a tendency to have diarrhea under excitement, and many know that they are likely to suffer an attack of diarrhea whenever they get panicky over something. Most of them are highly nervous, overreactive persons. A few who have insane relatives get their diarrhea when it suddenly occurs to them that they too might go insane. Others are allergic to certain foods, particularly milk. A few, for one reason or another, are drinking far more water each day than they need, and that tends to make the stools too soft.

Rather characteristic of a functional type of diarrhea is the fact that it will last for only an hour or so, or for only a day or two. A very helpful point is that persons with functional diarrhea seldom have to get up at night to empty the bowel. A helpful laboratory test is the blood sedimentation rate. In almost every case of regional enteritis or chronic ulcerative colitis that I have seen the sedimentation rate has been more than 50 mm. in an hour, whereas in cases of apparently functional diarrhea it has been less than 20 mm. Always it must be remembered that even when amebae have been found in the stools the diarrhea may all be due to a neurosis.

Tabagism.—I suspect that gastro-enterologists today commonly fail to make the diagnosis of tabagism. Ever so often I find myself unable to understand why a man is complaining of ill health, perhaps with heartburn, nausea, in-

digestion, abdominal distress, night pain, or loss of weight, until his wife tells me that she has noticed that his bad spells come whenever he gets so absorbed in some work that he smokes all day. Perhaps then he swears off tobacco and with this his symptoms disappear and he gains markedly in weight.

Regurgitation.—Many times a year I see a young woman who complains of "vomiting," but when I ask her, "Do you mean real vomiting or just the bringing up of mouthfuls of food?" she says, "Yes, that is what I mean." Especially when such regurgitation starts immediately or shortly after meals and especially when it is not associated with nausea I am sure I am dealing with a functional disease. In forty years I have never seen one of these patients cured by any form of operation.

Occasionally this disease is associated with anorexia nervosa and often there is abdominal pain which is relieved when food is brought up. In some cases I think there is a congenital tendency to the regurgitation, and in other cases the woman is psychopathic, unhappy, tired, or very nervous; often she is caught in some unfortunate situation which makes her unhappy. Men seldom complain of this trouble. Treatment must consist mainly of exhortations that the patient make an effort to hold down her food. An improvement in home conditions or the securing of rest may work a cure.

Gastritis.—Today gastroscopists are making the diagnosis of gastritis in many cases, but just what relation this diagnosis has to the symptoms complained of I seldom feel that I know. Under the circumstances I seldom ascribe a patient's troubles to gastritis. I am waiting for further knowledge.

Chronic Appendicitis.—Some may be asking, "How about chronic appendicitis?" In my experience this is a rare disease, and I rarely make the diagnosis. I dare to make it only when the patient, usually a young person, has had one or two attacks of abdominal pain which made the attending physician suspect the presence of acute appendicitis. If these were followed by indigestion and poor health then I think the appendix should be removed. Then there can be hope of effecting a cure.

Adhesions.—Where I work we do not make the diagnosis of adhesions from one year's end to another unless we think there are some which are producing occasional attacks of partial intestinal obstruction. As Osler said, "Adhesions are the refuge of the diagnostically destitute."

Diverticulosis and Diverticulitis.—Diverticulosis of the colon is commonly met with in persons past forty years of age. In all but a few cases it is probably symptomless. Diverticulitis, or inflammation of a few of these little pouches, is a rare disease, so rare that I sometimes go two or three years without seeing a single case. I think it is wrong to blame diverticula for symptoms unless the patient has had chills and fever with some intestinal obstruction, a tender mass in the left lower quadrant of the abdomen and a typical roentgenologic picture of spasm in the last 6 cm. of the descending colon where it forms the first part of the sigmoid flexure.

Pseudocholecystitis.—Every year I see a number of nervous and dissatisfied women who complain of an ache or "misery" in the region of the liver. The fact that their distress is usually constant, day in and day out for several years, satisfies me that it is not due to cholecystitis. I think in most cases the distress is of a psychosomatic nature, arising in the brain. Long experience has shown me that in these cases it is useless to remove the normally functioning gallbladder. In rare cases the distress is due to food allergy.

Pseudo-ulcer.—Many persons have a hunger-type of pain which may resemble that of ulcer so closely that the negative reports of roentgenologists have to be depended upon for the diagnosis. In other cases the atypical nature of the story can warn the gastro-enterologist that he is dealing with pseudo-ulcer. Commonly the pain is brought on by constipation, or by the eating of food to which the person is sensitive, or by an oncoming cold. The important thing to remember is that there is such a thing as pseudo-ulcer and hence, in the case of a person who has hunger pain, one must not blame one's roentgenologist if he refuses to make the diagnosis of ulcer.

Pseudo-appendicitis.—There are many persons with an ache or a burning or a pain in the right lower quadrant of the abdomen who go on having

trouble for years after the appendix has been removed. In many of these cases the distress is probably psychosomatic in origin while in others it is due to fibrositis or neuritis or an arthritis of the spine. In others I do not know what the cause is, but I am satisfied it is not located in the digestive tract.

Migraine.—Many of the women I see every week complaining of such things as fatigue, indigestion, dizziness, nausea, spells of vomiting and an inability to stand up to any strain have the habit of forgetting to tell their physicians that their upsets are commonly preceded by a headache. As a result, the diagnosis of migraine is usually missed, and this is a tragedy because if it were made it would throw great light on all of the woman's problems.

In most cases the physicians consulted could have made the diagnosis if they had only been trained to recognize the attractive, migrainous type of woman with her expressive eyes and mobile features, and her quickness of thought and movement. Then they would have drawn out the story of the headaches with the typical temperament: the great tendency to tenseness and fatigue, and the hypersensitiveness to light and sounds and smells.

I have rarely seen such a migrainous woman permanently helped by any operation on her digestive tract, but I have seen many of them almost cured through being taught to live with their handicap and to avoid fatigue, tension, excitement, worry and annoyance.

Constipation.—Many of the "dyspeptics" whom we physicians see each day are suffering primarily from constipation, and if only they would take a daily enema of warm physiologic salt solution they would be well. The diagnosis can be made by asking the patient if he or she feels like a new person for a few days after the bowels have been well cleaned out. Often in these cases the present-day treatment of constipation with bulk-producing substances does not work because, by the time the patient's bowels move, the colon is so full and there is so much back pressure up the small bowel that the patient is full of gas and greatly distressed.

Abdominal Distress or Pain Due to Arthritis, Fibrositis or Neuritis.—The gastro-enterologist is consulted each week by a number of patients whose abdominal pain or distress is not arising in the digestive tract at all. This should be clear from the fact that it is no better or worse for eating or moving the bowels or expelling flatus. Actually the ache or distress is arising out in the abdominal wall, and is due to a fibrositis, or neuritis, or an arthritis about the spine. Usually, when asked, the patient will admit that he or she is subject to attacks of lumbago, wry neck, cricks, sacro-iliac disease, sciatica, or arthritic pain or stiffness in several joints of the body. Often one can show that the trouble is in the abdominal wall simply by lifting up a fold of skin and subcutaneous tissue, pinching it lightly and causing the patient to flinch or to cry out with distress. It is sad to think that this common disease is almost unknown to physicians today, and that as a result many futile abdominal operations are daily being performed throughout the land.

A Thought in Closing.—The excellence and wisdom of any specialist can perhaps best be judged by the number of his patients whom he turns away with the statement that they are mistaken, and their disease does not come within his field of interest. Several times a day the wise oculist will say, "Your eyes are excellent, it is only your brain that is tired and at fault"; the lung specialist will say, "You do not have tuberculosis, and your so-called fever is due to nervous tension," and the heart specialist will say, "Your air hunger and palpitation and missing beats are not due to a bad heart but to your nerves that are playing tricks with you." Similarly the wise gastro-enterologist will spend much of his day telling worried persons that their story is not that of any known organic disease of any part of the digestive tract; perhaps it is not even that of indigestion, but rather that of nervousness, constitutional frailness, or fibrositis.

Many of his diagnoses will have to be made not by exclusion but from a good history and an intimate knowledge of neuroses seen many times before. He will not put pressure on his roentgenologist to make all of his diagnoses for him, and best of all, sometimes when the roentgenologist has noted a poorly functioning gallbladder or a deformed duodenal cap the wise

physician will disregard these findings because he knows so well that the patient's symptoms are all due to a neurosis or a depression or a small stroke.

RECENT ADVANCES IN METHODS OF HASTENING CONVALESCENCE THROUGH EXERCISE*

By F. A. HELLEBRANDT, M.D.
Richmond, Virginia

That rest of the affected part is necessary for recovery from disease is one of the oldest aphorisms in clinical medicine. To achieve this end the patient is subjected to localized immobilization, absolute bed rest or relative inactivity. When this regimen of disuse is protracted, it creates deterioration of function in normal organ systems, delaying the ability to resume physical work and muscular activity once recovery from the specific injury or disease has occurred.[1] The evils inherent in this paradoxical situation attracted little attention until the exigencies of the war epoch made prolonged invalidism a manpower waste which could be ill afforded either in industry or the armed forces. This gave rise to the initiation of therapeutic measures aimed at the hastening of convalescence. The recent demonstration of how much can be done to expedite the return of normal function by the systematic use of judiciously administered exercise, graded in dosage, is one of the important contributions of the period to human knowledge.

From time to time sporadic efforts have been made to introduce a wider use of remedial exercise into general medical practice.[2] Exercise played a part in the care and treatment of convalescent patients during the first World War.[3] Interest than waned and the literature records only an occasional experimental attack on the problems involved in the study of convalescence.[4] It was the British who rediscovered the importance of the physical training aspect of reconditioning.[5] They were quick to utilize the physical training expert in the functional reconstruction of the disabled. We soon followed their lead and the convalescent training and reconditioning programs subsequently devised in this country, were patterned in all fundamental aspects on the scheme evolved under the egis of the British Emergency Medical Services. The major points of physiological interest in these programs may be epitomized as follows: (1) the earlier use of active exercise as an adjuvant to other physical measures; (2) the treatment of the whole man in contradistinction to therapy aimed exclusively at the specifically involved part; (3) the substitution of an all-day program of restorative activities, physical and mental, curative and diversional, for a discontinuous type of physical therapy during which little is done for the patient in the intervals between treatment and during which psychosomatic relationships are largely ignored; and (4) the grading of exercise dosage on a sounder physiological basis than hitherto utilized. The benefits accruing from the convalescent training and reconditioning programs of the armed forces have been too widely publicized to require comment[6] other than appreciation of the difficulties associated with their critical evaluation.[7]

One of the unique features in the remedial exercise programs of the military hospitals has been the broad application of the principles and practices of physical education to the treatment of medical and surgical conditions. Interest in the biological effects of exercise had declined so markedly during the last quarter of a century that for a decade prior to the onset of the war, the exercise programs of the professional physical educator were designed almost exclusively to answer psychological, sociological and recreational needs. The necessity of quickly converting untrained men brought into the Army under the provisions of the Selective Service Act into soldiers manifesting a high degree of physical fitness, served to focus attention upon the more purely biological effects of exercise and led to a rebirth of interest in these. That exercise can rapidly improve physical fitness was abundantly demonstrated when the muscular activity prescribed was carried out to the physiologic limit of endurance, repeatedly taxing the machine beyond its ordinary capacity,

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*From the Baruch Center of Physical Medicine, Medical College of Virginia.

which is conditioned primarily by psychologic factors. This experience probably had a telling effect on the type of exercise programs subsequently devised for the prevention of reconditioning among the disabled subjected to prolonged hospitalization. Fortunately, the reconditioning and convalescent training programs of the armed forces were guided by physical training experts who had already witnessed the accession of good in the metamorphosis of exercise programs from their pre-war civilian to their newer military objectives. The practical importance of this return to exercise for its body building attributes cannot be emphasized too strongly, especially when this concept is superimposed upon a dynamic appreciation of the socio-psychologic benefits of participation in individual sports and competitive games, educational and prevocational activities.

Perhaps no modality in physical medicine has been used more empirically than therapeutic exercise and there is little demonstrable evidence in the clinical literature indicating that results purported to be produced are actually attained. In the treatment of the sick, injured and disabled, exercise is prescribed to accomplish a variety of different effects. Some of these are nonspecific. For example, to bring about the improved appetite, increased muscle tone and general sense of well being which characterize the systematic performance of vigorous muscular activity. The most important of the specific objectives of therapeutic exercise are three in number: first, to mobilize joints; second, to increase strength; and third, to develop coordination and skill in the performance of movement. The convalescent training and reconditioning programs of the armed forces have been concerned preeminently with the nonspecific effects of exercise.

The most outstanding fundamental contribution to the use of therapeutic exercise for the specific purpose of increasing muscular strength is that of DeLorme, developed at the Gardiner General Hospital in Chicago.[8] What DeLorme has done is to give to medicine a clinical demonstration of the practical importance of that phenomenon which is referred to by the exercise physiologist as the "overload principle." The experimental evidence in support of this principle has been reviewed by Steinhaus[9] and may be summarized as follows. Some years ago Christensen studied the heart rate and stroke-volume of men trained to perform progressively heavier work on a bicycle ergometer. If after having reached a constant value for a given load, the subject returned to a lighter load, there was less acceleration of heart rate and maintenance of a larger stroke-volume than when this work had been performed initially. Thus, exercising successively with an overload, enabled the heart to perform more economically at the lower level than training at that level, no matter how long continued. Similarly, Siebert found that skeletal muscle hypertrophy of slight degree could be produced in the rat by running at moderate speeds, but that conditions soon became stationary no matter how long the exercise was continued. Further increase in muscle size resulted only when the speed of running was markedly increased. In other words, hypertrophy is a function of the amount of work done per unit of time.

The importance of this concept is nowhere better illustrated than in recent experimental work supporting the efficacy of electrical stimulation of denervated or immobilized muscle in the retardation of atrophy. Solandt and his associates, Fischer, and Hines et alii,[10] have shown that stimuli of supramaximal intensity are necessary to achieve this end, that these need be applied for only a relatively short period of time, but that the response elicited must be vigorous. The effectiveness of the treatment is further augmented by having the muscle weighted and stretched during the period of stimulation so as to provide the opportunity for maximal tension development. Hines postulates this to be necessary in order to maintain proper alignment of the molecular pattern in the submicroscopic structure of the contractile tissue.

What DeLorme appears to have done is apply the basic principles of weight lifting to the restoration of muscle power in subjects suffering from disuse atrophy secondary to injury of the constituent parts of the locomotor apparatus. Weight lifting is a comparatively little known sport in this country. It is practiced primarily by those motivated by the desire to improve the symmetry and development of man's physical form. Interwoven in the lay

literature on weight lifting is a concept of training, arrived at through empirical experience, which is more sound in principle than much of our so-called scientific discussion of therapeutic exercise.[11]

Weight lifting builds muscle. Only two variables enter into the program prescribed. The first is the load against which the muscle contracts from a normal or slightly stretched resting length, and the second is the number of repetitions. The latter is permitted to vary within a circumscribed range, and therein resides the secret of the means by which hypertrophy is produced. Just as soon as a given load is lifted easily ten or twelve times, it is promptly increased. Thus the amount of work done per unit of time increases progressively, and is always pitched at a level closely approximating maximal power. Since a greater force is exerted by muscle if it is allowed to shorten slowly, the optimum rhythm for heavy-resistance exercise is relatively slow. This empirical practice is related to the viscous-elastic structure of living muscle. It is uneconomical to move either too fast or too slowly. Periodically, the muscle being trained is subjected to a "limit" performance, lifting the maximal load which can be carried once through the prescribed maneuver. Theoretically, more strength might be gained by the performance of a steady isometric contraction on the "limit" day, for muscle develops maximum tension when the load is so heavy that it is not allowed to shorten at all. Under these conditions the muscle maintains its optimum length for maximum energy production throughout the period of exertion.

Much ingenuity has gone into DeLorme's application of the principles of weight lifting to the development of a "heavy-resistance low-repetition" exercise regime for the treatment of a larger variety of orthopedic conditions. Only after strength is approximately normal, is attention turned to the extension of endurance by resorting to familiar forms of comparatively low-resistance, highly repetitive types of exercise. These overload the cardio-vascular-respiratory mechanisms rather than the skeletal muscles, and thus contribute to the staying power necessary before the disabled individual can tolerate a full day of physical work.

DeLorme has shown clinically that the strength of weakened muscles can be augmented only when these are forced to contract under load to the limit of their capacity. Such exercise, voluntarily performed apparently does no harm to the contractile apparatus of even markedly atrophied muscle. This digression from traditional procedure should lessen the physical therapists fear of fatigue. Although exhaustion syndromes are known to occur, before contraction fatigue can supervene under normal work conditions, the quanta of acetylcholine liberated at the motor nerve terminals probably falls below the threshold of the muscle fiber, or the accumulation of metabolites interferes with the neurohumeral mechanisms at the myoneural junction.

From his experience DeLorme concludes that weakened, atrophied muscles should not be subjected to endurance building exercises until the muscle strength has been restored by power building exercises, and that to obtain rapid hypertrophy, the muscle must be exposed to strenuous activity which at regular intervals approximates maximal exertion. A wealth of physiological knowledge supports his views.

The modern concept of muscle training which has emerged from the highly controversial discussion of the Kenny method of treating acute and convalescent poliomyelitis is a contribution of civilian medicine to new methods of expediting convalescence. This has drawn attention to the relatively uncultivated field of the physiology of motor learning. The acquisition of skill through exercise is as yet poorly understood.

Recent years have witnessed a lively interest in the genesis and development of overt behavior in the newborn and in the evolution of movement in the vertebrate embryo and fetus.[12] Coghill[13] has been the chief proponent of the view that behavior develops by the segregation of isolated reflexes from an initial unitary mass response. The earliest behavior patterns in *Amblystoma* are perfectly integrated. Local or partial patterns arise from the total response by progressive individuation related to the development of inhibition. The more recent histological and physiological studies of Windle[14] on the human fetus provide evidence for the opposite view, that is, that the development of behavior is reflexogenic from the outset, com-

plex acts being the resultant of progressive neuronal integration of more or less discrete functional components.

The spotty lesions of poliomyelitis disrupt or abolish previously acquired motor skills. The clinician has perhaps been too content with noting the presence or absence of performance, rather than the manner in which movement is executed. We now know that so-called "incoordination" is a conspicuous sign in many patients suffering from poliomyelitis. No one has yet attempted to interpret the discoordinations of acute and convalescent infantile paralysis in terms of other evidences of possible involvement of the neocerebellum, basal ganglia, and area 4 and 6 of the cortex in the initial pathological invasion.

Reasoning from first principles, it seems that a muscle training program constructed to progress in harmony with the growth patterns inherently present in the organism may have practical advantages over one which disregards the architectural scheme of fundamental mechanisms. Modern motor learning technics used in the treatment of poliomyelitis, appear to build ever more complex behavior patterns by the progressive integration of simple movements which are essentially short circuit reflexes to begin with. These are facilitated in the early stages of treatment by subliminal mechanical stimulation of the tendons of insertion at which the pull of the muscle being trained originates. A deliberate effort is then made to project the afferent components of this reflex over long-circuit proprioceptive pathways which terminate in the somesthetic cortex. The arousal of kinesthetic awareness is considered basic to the Kenny type of muscle training. This in turn facilitates cortical participation in the activity being practiced. Thus imperfect or inadequate manifestations of muscular contraction are recognized by the patient and actively corrected. Swartz[15] has recently postulated that muscle re-education is essentially a psychological procedure, predicating this view on the concept that mental elaboration precedes motor action.

The elicitation of early movements in patients with poliomyelitis is also facilitated by a particular postural set or limb position, designed to be most advantageous to the specific muscle or group being re-educated. As learning progresses, the previously necessary postural attitudes are gradually eliminated. Meticulously performed discrete simple acts are then slowly integrated into smoothly synergized behavior patterns composed of coordinated and accurately timed activities useful to daily living.

The simplest possible voluntary movements in man result from a single excitation of a single motor unit. Stronger twitches are the product of the synchronous, overlapping, or serial discharge of two or more units.[16] According to this view, gradation in contraction strength is due essentially to the progressive recruitment of increasing numbers of motor units. It is far more common in poliomyelitis to have a partial falling out of anterior horn cells and motor units than complete destruction.[17] Little is known thus far, of how effectively the full complement of those which remain can be brought into sufficiently synchronous phasic contraction to induce compensatory hypertrophy, without that irradiation of stimuli which results in disrupting incoordination and substitution.

Haphazard motor learning is almost certainly incapable of achieving the kind of rehabilitation now seen with increasing frequency as technical personnel develop more precise methods of muscle training along the lines described. Much of importance to the improved restoration of function in other pathological conditions besides poliomyelitis will almost certainly follow the wider use of these highly skilled and intelligently conceived technics. Though less dramatic in their influence upon the course of convalescence than the other recent advances reviewed, they are none the less important for they possess the capacity of reducing unavoidable disability to a minimum often compatible with the performance of surprisingly adequate smooth and rhythmical function.

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THE FEBRILE ASTHMATIC*

By W. A. SODEMAN, M.D.

and

V. J. DERBES, M.D.

New Orleans, Louisiana

The usual attack of bronchial asthma is not characterized by fever. The presence of fever, therefore, raises questions of extreme practical importance because the factors producing the fever under these circumstances are variable and because the treatment usually applied in the asthmatic attack is not likely to be satisfactory. It must be supplemented by other therapeutic measures which, when properly chosen, may be extremely effective. The present report concerns the variable causes of such episodes, which must, of necessity, condition the choice of the proper therapeutic procedures. Our experiences have disclosed certain clinical features which permit effective individualization of treatment. The following data and case summaries exemplify groups which must be so distinguished.

(1) *Pulmonary Changes on an Allergic Basis.*—A white man, 24 years of age, was known to have had bronchial asthma since the age of two. Investigations by skin test in the past had shown that he was sensitive to milk, chocolate, and house dust. However, despite elimination of these foods from his diet, a campaign against house dust in his home, and injections of a house dust extract, asthma had appeared periodically and had always been controlled satisfactorily by subcutaneous injections of epinephrine. Four days before admission to the hospital an episode of asthma began and was severe and intense. The first dose of 0.3 c. c. of epinephrine gave partial relief, but repetition of the dose in amounts up to 1.0 c. c. produced no response. Aminophyllin, administered intravenously in 3¾ and 7½ grain doses, likewise produced no relief. On the third day the patient became febrile with temperature of 101° F. The white blood count rose to 12,000 with 75 per cent polymorphonuclear leukocytes. Physical examination at this time disclosed the typical findings of bronchial asthma throughout both lungs with an area of impaired resonance and suppressed breathing in the left base. The patient had the worn haggard look of an asthmatic in distress and appeared somewhat dehydrated. After admission to the hospital epinephrine and aminophyllin were again tried. Epinephrine was given in 1:10,000 dilution intravenously without response. Vomiting was induced with syrup of ipecac with no results. Iodides and intravenous glucose produced no beneficial effects. Ether 3 ounces in oil 3 ounces, given rectally, produced some relaxation of the patient, but did not clear the chest of the asthmatic type of rales and did not relieve the dyspnea. Helium 80 per cent and oxygen 20 per cent were administered three times a day for a period of two hours and, although the mixture gave some reduction in dyspnea, it did not relieve the attack. Because of the possible presence of bronchial secretions which could be removed by aspiration, the patient was bronchoscoped and aspiration carried out. Very little thick sticky mucus was found and the patient was not relieved. Intravenous typhoid vaccine was then tried. It produced a chill and fever following which, in a period of 12 hours, the attack gradually subsided. The physical findings in the left base cleared up, the fever disappeared, and the patient became free of all distress. This occurred upon the seventh day of the attack.

This patient demonstrates the most common type of episode included under the term *status asthmaticus*. Here the patient had bronchial asthma, apparently of the extrinsic type, for a number of years. Relief had been obtained routinely by the use of epinephrine. However, with gradual onset of the last episode, the individual became both epinephrine- and aminophyllin-

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*From Division of Allergy, Department of Preventive Medicine, Tulane University School of Medicine, and the Charity Hospital at New Orleans.

fast, developed fever and all the appearances, fast pulse, leukocytosis, and the drawn haggard look, that patients in status asthmaticus show. When search was made for possible infection, as will be described below, no additional factor could be found to account for the refractoriness to therapy.

Asthmatic dyspnea is commonly considered to be due to three factors: (1) spasm of the bronchi, (2) edema of the bronchial mucous membrane, and (3) the presence of a thick, sticky, exudate which ordinarily constitutes the sputum which such patients raise and characteristically has a thick, glairy appearance. Microscopically it shows the presence of eosinophils and at times of Charcot-Leyden crystals. In patients of the type just described, apparently an excessive production of this thick gelatinous secretion, some believe from exposure to large amounts of antigen, so blocks the bronchial lumina that dyspnea results and aeration of the lungs distal to these bronchi is impaired. This may lead to the development of atelectasis which apparently accounts for the physical findings in this patient's left base. Since epinephrine may relieve spasm and edema, but has no remarkable effect upon the gelatinous exudate, patients in this stage become refractory to treatment with that drug. This type of status asthmaticus, therefore, rests entirely upon the allergic response but therapy must be directed at aeration of the lung by liberation of the gelatinous plugs as well as relief of the edema by the usual means (epinephrine and removal of the offending agent, if possible). The occurrence of fever, as in the patient above, is very common after the third day. It often lasts for three or four days when the attack may terminate before the temperature reaches normal. It has sometimes been ascribed to a low grade pneumonitis distal to the plugs from the usual organisms which inhabit all respiratory tracts.[1]

It is not certain that the therapeutic procedures carried out upon the above patient were important in termination of the attack, for such attacks commonly terminate spontaneously at about this time, although they may last for 10 to 12 days or longer. It may be that the febrile response produced by the intravenous typhoid was effective in what is commonly termed breaking the attack. It is known that if the thick, glairy, gelatinous secretion can be moved, either by expectorants, by rehydration of the patient, by removal through bronchoscopy, or by other means, re-aeration of the lung takes place and the attack will terminate. The patient may then, in future episodes, again be relieved by epinephrine. Dehydration, therefore, and atropine sulfate, or any procedure which might inspissate the secretion of the membranes, is contraindicated in the care of such patients.

The term allergic bronchopneumonia has been applied to certain patients that fall into Group 1 because of the changes in the lung parenchyma which result from the allergic reaction itself. Such pictures are characterized by frequently changing physical and roentgenographic signs. Febrile responses may occur at this time and the picture, therefore, is confused with recurrent bronchitis, bronchopneumonia, tuberculosis, pulmonary abscess or foreign body. Such an episode may, particularly in children, start with symptoms resembling the common cold. With the appearance of cough, asthmatic breathing, fever, and leukocytosis, considerable difficulty may arise in the differentiation of the ordinary type of bronchopneumonia. Since epinephrine has little effect, a bacterial pneumonia is further suspected. Cohen[1] has shown that separation of the patient from the offending allergen, by air filtration for example, to permit the subsidence of the allergic edema, will help permit liberation of mucous plugs and encourage drainage. Rehydration, if the patient is dehydrated, will help accomplish the same thing. Expectorants, as already mentioned, also are helpful and occasionally bronchoscopy may be necessary, as was carried out in the above patient. When such circumstances are the cause of the episode with fever and these therapeutic procedures are successful, the fever will abate and the physical signs disappear. Sulfonamides will not be particularly helpful unless a program of proper drainage is instituted.

There are two other types of pulmonary disease associated with asthma and fever which must be considered in Group 1: one is so-called Löffler's syndrome and the other tropical eosinophilia. In 1932 Löffler described a syndrome of transient pulmonary infiltration with associated leukocytosis and eosinophilia. This was noted particularly in allergic individuals and accom-

panied at times by persistent severe asthma.[2] Varying degrees of leukocytosis and moderate degrees of fever are associated. Evidences of pulmonary consolidation at times are found. The history of frequent respiratory diseases in such patients might lead to the assumption that response would be obtained from sulfa drugs. This in general, however, is not true. The picture is benign in nature but pulmonary infiltrations seen in the roentgenogram at times are confused with tuberculosis and may be indistinguishable from some of those seen in that disease unless serial plates are made. However, the above story, as described, with a varying roentgenographic picture and the presence of blood eosinophilia are ample for differentiation. Löffler felt that partial atelectasis did not account for the picture he described. He considered ascariasis as a possible cause and others, since then, have found worm infestations and amebiasis associated with the picture. This picture must be considered in the diagnosis of individuals with severe asthma accompanied by fever.

Tropical eosinophilia is a rare clinical entity occurring or originating in the coastal areas of India and possibly elsewhere. The authors have not seen this picture, but it is described as producing physical findings such as those found in bronchial asthma, is accompanied by paroxysmal cough, loss of weight, low grade fever, and, after a few weeks, a chronic stage in which fever may be absent but the wheezing persists. Chest roentgenograms in the first few weeks are described as resembling those seen in miliary tuberculosis, but later show only increased bronchial markings. Mites have been found in the sputum[3] in certain instances and have been suggested as the etiologic factor. Arsenicals are said to be effective therapeutically. The syndrome is mentioned here only because of the occurrence of asthma and fever and the possible allergic relationships.

Clearly, as may be seen from the case report given as well as other data discussed, allergic disease itself may be primarily responsible for the febrile asthmatic, but even when this is so, there may be need for drastic revision of the therapeutic program. Fever is, therefore, an important sign.

(2) *Bacterial Bronchitis.*—A white man, 54 years of age, had had for 13 years recurrent bouts of bronchitis characterized by spasmodic cough. Sputum was usually mucoid. In the past two years the attacks were precipitated by upper respiratory infection. Each had been accompanied by wheezing, and on physical examination in the attacks musical rales were always heard throughout both lung fields. In recent years cough had been persistent between attacks. There was no past or family history of allergy. Over 100 skin tests applied by the scratch method had disclosed nothing of importance. Five days before presenting himself for treatment the patient developed cough, pain in the retrosternal area and a purulent sputum. The temperature reached 101° F. Audible wheezing developed and was not relieved by epinephrine and intravenous aminophyllin. Microscopic examination of the sputum showed a purulent exudate with a mixed bacterial flora, predominantly short chain streptococcus and lesser numbers of pneumococcus and staphylococcus. Administration of sulfadiazine, 4 grams followed by 1 gram every four hours, was accompanied in two days by marked reduction in sputum with disappearance of the purulent character and a recession of the asthmatic signs and breathing.

This patient had the history of a so-called intrinsic asthma with asthmatic bronchitis. It has been suggested that, in such cases as this, bacterial sensitivity exists and the patient may be refractory to treatment until the agent is removed, in this instance by the sulfonamide drug. It seems to us that a more likely explanation is a significant narrowing of the bronchial air space in strategic areas by the purulent exudate sufficient to produce asthmatic breathing not relieved by bronchodilators and drugs relieving allergic edema. Status asthmaticus ensued, which was epinephrine-resistant. The history, physical findings, and the character of the sputum all pointed clearly to a narrowing of the air space by conditions amenable to treatment with measures pointed toward elimination of the purulent exudate. In this instance such treatment was successful. Such cases have been described previously by Weil and Climo in 1940.[4] The recognition of the nature of the episode is most important for the application of the proper therapeutic agent, be it a sulfonamide or one of the antibiotics, may be the only means of relief. The cause of status asthmaticus in this group is different then from the cause in Group 1. It appears that the physician must not be satisfied with a diagnosis of status asthmati-

cus but, as in fever or jaundice, he must seek further for the type of disease producing it to apply proper treatment.

(3) *Peribronchial Pneumonitis.*—A case exemplifying this group will not be detailed here because, except for evidence of clinical pulmonary parenchymal involvement, the findings are very similar to those of Group 2. Peribronchial pneumonia is likely to give more evident physical signs, particularly groups of fine rales, and at times even evidences of consolidation either by physical examination or on roentgenographic study of the chest. The systemic response, including the fever, is likely to be greater than in Group 2. Here too the asthma is commonly of the intrinsic type and often associated with chronic bronchial inflammation with or without bronchiectasis. Again the history, physical findings, sputum studies and roentgenogram of the chest will establish the diagnosis. The patient is also likely to be epinephrine-resistant and therapy is similar to that of Group 2.

(4) *Bronchostenosis.*—A white man, 32 years of age, had had bronchial asthma since childhood. Attacks were always typical until the preceding eight months. Since that time paroxysmal cough, severe and non-productive, had characterized three attacks, the last two of which were ushered in by an upper respiratory infection. Fever to 101° F. occurred and the white blood count reached 11,000, with 70 per cent neutrophiles. In each, after 72 to 96 hours, a purulent sputum was finally produced and the fever receded. On each of these three occasions fine rales were persistent in the left base, and chest roentgenograms disclosed some increased densities, interpreted as bronchopneumonia in that area. With the last episode some blood streaking of the sputum led to bronchoscopic examination which disclosed a localized stenotic area in a bronchus to the left lower lobe. Dilatation of this area was done followed by aspiration. Postural drainage was instituted and relief was obtained.

Such cases as these are relatively uncommon. The stricture-like narrowing may occur in patients with preceding episodes of either allergic or intrinsic asthma. Severe persistent, at times paroxysmal, cough with difficulty in raising sputum is usually followed by a profuse, mucopurulent sputum which may be blood-streaked.[5] This occurred in the above patient. Fever, at times with chills, appears and leukocytosis is usual. As in the above case, pneumonia is often a mistaken diagnosis. Here again a specialized form of therapy, dilatation of the stenotic area, is necessary.

(5) *Fever Resulting from Therapy.*—Individuals with bronchial asthma may become febrile from therapeutic procedures. Hyposensitizing injections of pollens, room inhalants, or animal danders may cause systemic or constitutional reactions. These reactions are frequent and may be manifested by the development of urticaria, hay fever, or asthma. Occasionally such patients may at the same time receive enough pyrogens in the solutions injected to develop fever. With the quantities of material customarily used, the temperature rise seldom exceeds two or three degrees and seldom persists more than four or five hours. We have seen a patient in whom the temperature rose to 104° and in whom the temperature was not entirely normal for 12 hours. The febrile response is fairly rapid, may develop in an hour or less. The constitutional reaction usually makes its appearance within 15 or 20 minutes so that there may be a simultaneous occurrence of the two phenomena which are really unrelated for the one is due to antigen-antibody interaction and the second to contamination. Occasionally, but rarely, other agents or drugs may produce fever when taken for asthma or symptoms associated with it. There are several instances[6] recorded in which sulfadiazine caused asthma and/or fever. The correlation of the fever with these incidents should not be difficult to establish.

(6) *Intrathoracic disease* is important in its own right, with asthmatic breathing as a symptom. Case examples will not be given here because of their great diversity. Asthmatic breathing, wheezing with dyspnea, may occur in many diseases other than bronchial asthma. Aneurysm, tuberculosis, bronchogenic carcinoma, heart failure, bronchial foreign body, Boeck's sarcoid, acute bronchitis especially in children, medi-

astinal tumors and abscess, are a few examples. Symptoms characteristic of such conditions, some with fever, coupled with asthmatic breathing, may lead to erroneous consideration of bronchial asthma with status asthmaticus, refractory to the usual therapy. Treatment rests upon recognition of the underlying condition and application of the proper procedures, which are too varied to discuss here.

(7) *Asthma with Unrelated Febrile Disease.*—In this group fall uncommon instances in which asthma and unrelated febrile disease occur coincidentally. Past history, together with the clinical picture and careful examination will disclose the two separate pictures. Fever, for example, has lead us to a careful search which has uncovered unsuspected tuberculosis, the pulmonary physical findings of which were obscured by the asthmatic picture.

SUMMARY

The above observations of fever in association with asthma and an analysis of the circumstances under which both occur together indicate that (1) fever is usually not a part of the picture of uncomplicated asthma; (2) fever in asthma is an important finding which should stimulate the physician to a search for the underlying cause; (3) the febrile episode may be related or unrelated to the asthmatic episode; (4) the presence of fever indicates that specialized forms of therapy dependent upon the cause of the fever, may be necessary for successful management of the patient; (5) clinical findings are usually sufficient to classify the patient for proper treatment; (6) one should not be satisfied with the diagnosis of status asthmaticus but should uncover the type of disease producing it, for successful treatment of the attack varies with the factors producing the episode.

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TREATMENT OF ROENTGEN SICKNESS WITH ORAL ADMINISTRATION OF PYRIDOXINE HYDROCHLORIDE (VITAMIN B_6)*

By ROBERT J. REEVES, M.D.
Durham, North Carolina

The subject of roentgen sickness has been one of great concern to all radiation therapists. There have been many theories advanced as to its cause. Numerous and varied methods of treatment have been advocated for its prevention. No single method, however, has been found which is universally satisfactory. The barbiturates were found effective in that they were mildly hypnotic. Liver compounds are helpful in some cases. Other methods too numerous to mention have been advocated. Vitamin B_1 was reported by Moursund and Martin,[1] as being definitely beneficial to a larger group of patients. It was their belief at that time that roentgen sickness was a definite vitamin deficiency. With the use of B complex, the results seemed to be even better than with B_1. There were still a good number of cases who failed to respond.

Maxfield and co-workers,[2] in 1943, tried pyridoxine hydrochloride intravenously and found that a single dose of 25 mgs. daily would usually relieve the most obstinate sickness and frequently the nausea disappeared and injections could be discontinued and irradiation carried on without subsequent sickness. However, other medication was not excluded and liver extract, high-vitamin intake, and sedatives were used where indicated. Maxfield reported a series of over 50 cases where the results were most gratifying.

Willis and Massey,[3] in 1942, recommended the use of pyridoxine in the nausea and vomiting of pregnancy. They gave 20 mgs. intravenously and found it to be very effective. More consistent good results were obtained than with thiamin chloride.

Vitamin B_6 has been described in detail and

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*From the Department of Radiology, Duke University School of Medicine.

synthesized by Stiller and co-workers.[4] It was originally isolated from rice bran. The vitamin is stable to acids and alkalis. It has a definite absorption spectrum which changes markedly with change in hydrogen ion concentration. Stiller found the synthetic vitamin B_6 (pyridoxine) to be identical with the natural vitamin B_6. A single dose of 100 gamma of synthetic B_6 in rats on a B_6 deficient diet gave a curative effect which paralleled that of the natural vitamin B_6.

A statement has been made that pyridoxine may be a carcinogenic agent. Extensive studies have been made to determine its effect on tissue growth. Kline and co-workers,[5] implanted the Flexner-Jobling carcinoma into rats partially depleted of pyridoxine and found the percentage of takes lower, the number of regressions higher and the size of the tumors smaller than in control animals receiving the same number of calories. Similar results were observed with two types of transplantable mouse tumors: the Yale carcinoma I and a fibrosarcoma originally induced by ultra violet. A low percentage of tumors in each of the deficient groups grew as well as the average for the corresponding group on the complete diet. The production of skin tumors in mice painted with methylcholanthrene was definitely retarded on a diet low in pyridoxine. They could not prove that sarcomas were more active in mice on pyridoxine deficient diets.

Miner, Miller and Bauman,[6] also reported extensive studies on the relation between vitamin B diets and cancer. They found the production of tumors to be more difficult in animals raised to maturity on a diet consisting of fortified milk than in animals raised on a diet relatively low in the B vitamins.

We find no evidence that pyridoxine is a definite carcinogenic agent. It is not surprising that tumors were found to grow less readily in pyridoxine deficient rats as pyridoxine is a vitamin and consequently is a growth factor. Workers at the Merck Institute for Therapeutic Research[7] have studied the effect of the chronic administration of massive doses of pyridoxine to mice and no carcinogenic effect was found.

It has been found that there is a maximum absorption after oral administration of pyridoxine hydrochloride in 3 to 4 hours. The fact that the drug, when given intravenously, proved so satisfactory led the author to try oral administration because of its simplicity, and also because of slower absorption and excretion. A total of 100 cases who developed roentgen sickness have have been followed since March, 1944, to the present date. A dosage of 50 mg. of pyridoxine hydrochloride was given orally in the mornings, about 4 hours before the patient received irradiation. Another 25 mg. was given at noon and 25 mg. before the evening meal, making a total daily dose of 100 mg. This routine was started at the onset of the roentgen sickness and continued as long as nausea persisted. It is of interest to note that some patients were relieved of roentgen sickness and the drug discontinued before irradiation was completed, while in other instances sickness reappeared after stopping the drug, but cleared up when B_6 was again administered.

Of the series of 100 cases treated, 45 were over the pelvis for carcinoma of the cervix, rectum or bladder. These cases received an average of 8,000 to 10,000 r. distributed over the pelvis. The field of irradiation was usually 10 x 15 centimeters. The average daily dose was started at 150 r. to each of two opposing parts daily and increasing this 50 r. daily until 300 r. was delivered to each of two opposing parts. Only 21 patients in this group had actual vomiting following irradiation. The results obtained in this group are shown in *Table 1*:

Two of the cases who received no benefit from oral administration of B_6 responded readily to a single dose of 25 mg. given intravenously. In four cases the drug was discontinued, sickness returned but cleared up after further adminis-

Total cases	Nausea and vomiting	Nausea	Results		
			Good	Moderate	No benefit
45	24	21	25	16	4

Table 1

tration of B_6. Ten patients had a second series of irradiation with varying degrees of nausea, but responded to B_6.

Of the larger group of 55 cases treated over the thorax and upper abdomen, consisting chiefly of postoperative carcinoma of the breast, lymphoblastoma, polycythemia and Marie-Strumpell arthritis, the results are tabulated in *Table 2*.

Because of a certain psychic element it is difficult to evaluate systemic reactions in some individuals. We again found that cases who did not respond favorably to oral administration of B_6 would respond to 25 mg. of the drug.

ADDENDUM

The third group of cases were furnished by Dr. Paul C. Swenson of Jefferson Hospital, Philadelphia. He reported treatment of 35 patients with pyridoxine. The dosage was essentially the same as ours. One-half of the group were treated over the abdomen. They were either abdominal Hodgkin's disease, carcinoma of the cervix, or other abdominal tumors. The other half were cases where considerable irradiation was taking place over the torso, either the chest for malignancy of the lung or breast, or over the back because of malignancy in the skeleton or retroperitoneal region. This latter group seemed to be especially benefited. The cases receiving irradiation over the abdomen were divided into two groups. One group did not receive pyridoxine until symptoms developed. The other group was treated prophylactically with 25 mg. orally, three times a day at the beginning of irradiation. The latter group never developed any degree of irradiation sickness, nothing to compare with other patients receiving no medication. Dr. Swenson states,

"It is my conclusion that B_6 is of definite benefit in helping to control roentgen sickness. No controls were run other than semi-controls in giving one group the vitamin prophylactically and in the other, only when symptoms were complained of. It was of interest that once symptoms developed, it was more difficult to eliminate them, but when the drug was given prophylactically the symptoms were less severe."

Total cases	Nausea and vomiting	Nausea	Results		
			Good	Moderate	No benefit
55	13	42	52	2	1
Above cases second series irradiation					
32	12	9	28	3	1

Table 2

SUMMARY

Pyridoxine hydrochloride was given in daily amounts of 100 mg. and was found to be definitely more effective in treatment of irradiation sickness than many other drugs. The routine of 50 mg. after breakfast, around 7 o'clock in the morning, 25 mg. at noon and 25 mg. after dinner seemed to work better than 25 mg. three times daily. Oral administration is advocated because of its simplicity, ease of administration, and effectiveness. The occasional case which does not respond to the oral administration responds readily to intravenous injection. Failures from the use of this method were partly explained since the factors of nutritional balance and general care play a part in the effectiveness of any treatment.

The author is indebted to Merck and Company for the Vitamin B_6 (pyridoxine hydrochloride) used in the treatment of most of these cases, and to Dr. Paul C. Swenson, Jefferson Hospital, Philadelphia, Pennsylvania, for allowing us to use his material.

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ANOREXIA NERVOSA WITH SPECIAL REGARD TO INSULIN THERAPY*

By DAVID C. WILSON, M.D.,
DOROTA RYMARKIEWICZOWA,
and
W. MOTLEY WHITE, M.D.
Charlottesville, Virginia

In *Borderlands of Psychiatry*, a Harvard Monograph, by Stanley Cobb[1] we find the following discussion of anorexia nervosa. Cobb says:

"It is, I believe, a disease entity 'sui generis.' The patients are young women who in adolescence become disgusted with fatness or voluptuousness in any form. They diet to remain slim and boyish. Menstruation ceases, appetite is lost, but in spite of emaciation they seem to have remarkable energy, insist on activity, and often actually drive themselves to death. The typical home situation is a robust, nagging mother, and a passive father. Incipient love affairs or plans for marriage are often precipitating events. If the patient is taken into the hospital and forcibly fed, she can be brought back to a fairly normal nutritive state, but she usually relapses and repeats the cycle after a few months."

Richard Morton[2] in 1694 referred to "consumption of mental origin." Sir William Gull[3] in 1868 described a disease rare in males which occurred usually in young girls from 16 to 23 with resultant severe emaciation, amenorrhea, changes in temper, and associated remarkable energy. He considered this disturbance was due to a "morbid mental state." He called it anorexia nervosa. Laseque[4] stressed its frequency among females. His name for it was hysterical anorexia. Dejerine and Gauckler[5] were convinced that the syndrome was entirely emotional.

However, in 1913 Falta[6] diagnosed a pituitary dystrophy clinically, which portrayed symptoms similar to anorexia nervosa. In 1914, Simmonds[7] described the pathology of hypophyseal cachexia. Following this discovery, the two conditions were often confused, and it is only within the last decade that anorexia nervosa has appeared once more as a separate entity. Simmonds's disease showed an incidence of two females to one male, instead of the four females to one male, which is found in anorexia. An age limit of 20 to 60 characterizes Simmonds's disease, as against 10 to 40 in anorexia. There is a 51 per cent amenorrhea in anorexia against 86 per cent in Simmonds's disease, and finally 100 per cent mortality with the hypophyseal cachexia against a 6 per cent for anorexia nervosa. This was according to Turner[8] who reported before the meeting of the American Association for Physicians at Atlantic City in 1938.

Richardson[9] in 1939 again differentiated anorexia and Simmonds's disease. Sheldon and Young[10] in 1938 exploited the sugar metabolism. Blood sugar was often low, and there was a tendency to hypoglycemia, but as the weight returned to normal, the blood sugar did also. The low blood sugar might well be a result of starvation. Rohman, Richardson, and Ripley[11] gave the psychiatric details of twelve cases in 1939. They stressed oral factors and fears of oral impregnation. Magendantz and Proger[12] in 1940 used small doses of insulin before meals, but they did not obtain successful results. They also stressed the schizophrenic features of the disease. Waller, Kaufman, and Deutsch[13] presented the analysis of two cases demonstrating oral fixation with fear of oral impregnation. The breast symbolized the penis, and constipation represented pregnancy with amenorrhea. To quote from this article, we get the following description of their impression of the syndrome:

"We see then a syndrome, the main symptoms of which represent an elaboration and acting out in the somatic sphere of a specific type of phantasy—the wish to be impregnated through the mouth—which results at times in compulsive eating, and at other times in guilt and consequent rejection of food. Constipation symbolizes the child in the abdomen, and the amenorrhea has direct psychological repercussions—pregnancy phantasy. This amenorrhea may also be part of the direct denial of genital sexuality."

Ruth Moulton[14] showed that there is no parallelism between estrogenic hormone secretion and the syndrome. Frequently the patient did not tolerate her own estrogenic secretions. The injections of such substances only added to the conflict. John A. Rose[15] demonstrated that antagonisms to eating in childhood were due to distaste for change and hatred for growing up, an interpretation described by Brown and Crookshank[16] in 1931 and applied by him to

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adult cases with this syndrome. Berkman[17] in 1943 showed that the basal metabolism came to normal as the weight reached the standard for the height. Milhorat and Small[18] studied the weight loss, and found that the patient's anxiety produced loss of weight even in a normal diet. Berkman[19] again in 1945 applied the syndrome to many conditions. He believed that proper psychotherapy added to a 3,400 calorie diet, to be kept up until the patient was over her standard weight for at least six months, would bring about a cure.

Cure is a word used very rarely in the literature of this disease. Apparently these individuals may be improved and live better adjusted lives. Seldom are they well, and often they relapse to their former condition under strain. As the disease continues, some make a psychoneurotic adjustment, usually of a hypochondriacal character. Others develop compulsions and obsessions as a substitute reaction. Since the beginning, writers have stressed the similarity of this reaction to schizophrenia. Each case is said to have schizophrenic or schizoid symptoms. Other authors have discussed anorexia nervosa in frank cases of schizophrenia.

It was thought worthwhile, therefore, to study ten cases which presented this syndrome with this reaction in mind. Then, if these individuals turned out to present a definite anorexia syndrome, treat them with deep insulin therapy in an effort to change their personality reaction. It was known that insulin in small doses had been tried before. It was also known that in Simmonds's disease, it was very dangerous to give insulin, and that the cases that we were studying very frequently showed hypoglycemia and were prone to go into insulin shock. In spite of this, it seemed worthwhile to take all the risks, if this very obstinate personality reaction could be modified. Certainly there was nothing in the literature to make us feel that any other method might prove successful. The following are abstracts of the ten cases considered especially from the social point of view, from the physical standpoint, from the point of view of the laboratory, and from the psychological point of view. The results of insulin therapy are given in five of the cases, and these are contrasted with the five cases that did not have insulin shock.

Case 1 (*Hospital No. 197,892*).—Alice S., a white single female 31 years of age entered the University Hospital on September 3, 1944, complaining of tenderness in the back of the neck, lack of appetite, constant fatigue, and an inability to relax. She had been sick for four years and this sickness seemed to have been precipitated by an unhappy love affair at that time. Her father was described as occasionally being nervous and irritable, but jolly most of the time. He took no responsibility for the home. The mother, now a complaining, chronic invalid, very hard to please, is in need of constant attention from the daughter. The patient, the father's favorite, continually quarreled with her mother. She was valedictorian in high school, and moderately popular, but rather shy and tending to withdraw from contacts. She was very homesick when first away from home. Since she had little interest in sex, there was no masturbation; and as her mother objected to all her affairs with boys, there had never been any sex play. Her menses began at 14 years of age and were always irregular and accompanied by severe cramps and sickness. Whenever she had difficulty with eating, her menses would stop entirely. At the time of admission she was quite slender with a weight of 103. Laboratory studies were all within normal limits except for a basal metabolism of minus 11. Psychotherapy was tried with ventilation, explanation, and reassurance with little effect. She was then given an insulin course with forty deep shocks, going into deep shock on 100 units. This produced a weight gain of 12 pounds, an increase in appetite, a lessening of anxiety, but no insight.

Case 2 (*Hospital No. 196,408*).—Martha T., an unmarried white female of 25, entered the hospital on January 5, 1944, with the complaint of persistent lack of appetite, and vomiting of one year's duration. She had been sick for one year and lost 68 pounds. The precipitating factor seemed to be a return home after being employed away from home for two years. Her father was alive, but had heart disease and was quite fat. He had a great deal of gastro-intestinal trouble, accompanied by continual vomiting. The domineering mother was alive and well. The patient stated that she loved her mother much better than her father, but she felt that the whole family dominated her, especially in the matter of love affairs. She had always been of a nervous temperament, depending upon the family for decisions. At the time of illness, the family would not allow the patient to see a boy friend whom she liked very much, but instead tried to force a boy friend upon her for whom she had no feeling. Her menses started at 14 years of age. They were always irregular, and very frequently there was six to eight months' interval between periods. She had not menstruated for the last 19 months. Her thyroid was moderately, diffusely enlarged. Laboratory studies showed a basal metabolism of minus 21. A gastro-intestinal series showed extreme pylorospasm, but was otherwise negative. She was given ambulatory insulin of 25 units a day for four weeks which seemed to improve her appetite for solids. With psychotherapy she seemed to get some insight, and admitted that her vomiting might be

psychogenic in origin. She was given estrogens, and with them seemed to improve.

This is the one case in which ambulatory insulin was used. Along with this form of therapy, there was a good deal of ventilation of her problems. One of the advantages of the ambulatory form of insulin therapy is that it permits closer contact with the patient while she is influenced by the drug.

Case 3 (*Hospital No. 208,279*).—Verna K., age 20, was admitted to the hospital November 29, 1944, because of a "closed" sensation in her throat when she tried to swallow. She was hungry, but could not swallow, occasionally vomiting. Her father was an alcoholic truck driver. Her mother had always been nervous, had hypertension and had suffered especially when the father went on sprees. The patient said that she does not like her father as well as she used to, and that her father did not like her especially, certainly not so well as her younger sister. He was a voracious eater, and his eating habits disgusted the patient a great deal. The mother was over-protective, being quite concerned about the daughter's illness. She stated "Daughter is the most silent and suffering person I have ever known." The patient has always been quiet, reserved, and cooperative. Her mother said that she had been kept on a bottle until she was six years of age, because she always became ill when any attempts were made to wean her. The mother also said that she could not get her to go out with boys, and that she seemed to have no sex interests at all. The patient said that there had been no masturbation, but she had been greatly upset when at the age of six she had witnessed her father and mother having intercourse. Her menses began at 14 years of age and were always scanty, irregular, and painful, and disabling. She had a good deal of tension with increased anorexia and choking at these times. She weighed 85 pounds, and her height was 5 feet 3 inches. Laboratory studies were practically normal throughout. Her basal metabolism was not done. She was given insulin up to 120 units which did not produce shock, and the insulin was then discontinued as we were afraid to go on. Psychotherapy was attempted, and some insight obtained. She increased in weight 12 pounds, and was discharged as improved.

This case illustrates that some cases of anorexia are not insulin sensitive, and also that unless there is deep shock with insulin, little improvement in appetite and weight is obtained.

Case 4 (*Hospital No. 207,772*).—Mrs. John C. had had symptoms for 18 years when she entered the hospital November 13, 1944. She was 42 years of age, and had been married 18 years. She was generally tense, weak and hungry, but could not eat. She vomited all that she ate. The disease apparently started with the onset of menses. Her father, who had always been "sick at his stomach," had died ten years before with a stomach condition. The mother, alive, well, and extremely energetic, had always made the patient's decisions for her. When the patient was a child, the father was an unstable ne'er-do-well. She was supposed to resemble her father more than her mother. As a child the patient had two attacks of somnambulism during which she tried to murder her mother. As she grew older she became more attached to the mother, but she resented her mother's interference in her affairs. She was small, extremely energetic, and enjoyed telling and writing of her difficulties. She was not interested in sex until she started going with her husband. After they had been married a short time, something "snapped," and from that time on she did not want to have sex relations. These were not carried out for many years. Intercourse was always painful and most unsatisfactory. The patient said she had really been frigid all her life. Menses started at 13 years of age and were quite irregular. The flow was scanty, and very frequently periods were accompanied by vomiting. There was a great deal of ritual connected with the periods, amounting almost to fetish. Physical examination showed tender breasts, a weight of 92 which signified a loss of 43 pounds over a period of five years. Basal metabolism was plus and minus 0. X-rays of the gastrointestinal tract showed a definite delay at the ligament of Treitz, and a secondary dilatation and reverse peristalsis. Psychotherapy was tried without result. She was given 23 deep insulin shocks and she had her first deep shock with 85 units. There was a weight gain of 8 pounds, and she was still gaining when she left the hospital. Her appetite was improved; her disposition was more pleasant; but she had very little insight or understanding of her condition.

This is a fairly typical case of anorexia nervosa of long standing. The patient was most refractory and obstinate. Insulin shocks did stop her circle of vomiting and at last report, she had returned to work and was still holding her weight. One year later, the patient still claimed that all our explanations of her reactions were very foolish and had nothing to do with the case.

Case 5 (*Hospital No. 212,383*).—Mrs. Grace P. had been married eleven years. There were no children. She had had persistent vomiting and nausea for six months' duration, when she entered the hospital on June 24, 1945. There had been no previous attacks. She is said to have had an acute onset with abdominal pain and fever, and the home doctor had diagnosed it as "nerves." The father was 79, and had been sick for 26 years with a dilated heart. He had a "wonderful personality" and was supposed to look after the mother as if she were a small child. The mother was a mill worker, demanding much, and there had been much friction between the patient and the mother since adolescence. Recently, the mother was injured and severely disfigured. This incapacitated her, so that the patient had been managing the mother's home and her own. The father and patient were very devoted. She

used to cry over the fear of her father's dying. He was easy going, understanding, and had a good sense of humor. The patient and the mother had been in conflict since adolescence. She had always slept in the room with the parents up until she was 14 years of age because of "nervousness and fear of the dark." She dated her husband 18 months and was married at 24. The first marital experience was "horrible," "disgusting," and "painful." She insists that her husband is very fine, but that she would like to dispense with all sexual acts. She was a premature child, eight months' birth, and she weighed 3½ pounds when born. Her menses started at 14 years of age. Four months elapsed before another menses. Two and one-half years later she had her third period. She lost 37 pounds from January to July, 1945. Laboratory studies showed a fasting blood sugar of 91 mgm., but otherwise there were no definite abnormalities. She was given five injections of ambulatory insulin with little improvement. She was then given deep shock with 100 units, following which there was marked improvement in appetite and food consumed. However, there was very little improvement in weight.

There is some father fixation, certainly more than the average for this syndrome. Results from the insulin have been maintained as evidenced from a visit in November, 1945. The patient, however, is now developing a good many hypochondriacal complaints.

Case 6 (*Hospital No. 206,166*).—Virginia C. was a single girl of 20 years, who entered the hospital on September 23, 1944, because of marked loss of appetite with vomiting of practically everything she ate, of three years' duration. There was fatigue with lack of energy. The attack started when the boy with whom she had been going for three years became engaged to her. The father was tall, slender, easy to get along with, and never harsh with discipline. The patient says she resembles him. The mother, a former nurse, was large, energetic and domineering, a great talker and running the patient's life. The patient was known as mother's baby, and when ill had been spoiled by the entire family. She was a high school graduate, and had finished a business course. She was dependent, shy, spoiled, and socially retiring, colorless, tearful, and submissive. She had a great fear of water. She had never been away from home for a very long period of time. When 8 years old, she witnessed intercourse between a girl friend and the girl friend's brother, and felt that she had sinned at this time because she had witnessed the act. She did not want to set a date for marriage, because she was afraid that when the wedding day came, she would be sick and unable to go through with it. She had sore throats of undetermined etiology. Her menses started at 13, were always painful and scanty, and she had to go to bed for a week. There was a two-year interval between the first and second periods and they have been irregular ever since. Her weight was 97, and she had lost ten pounds in the last year. Fasting blood sugar was 95 mgm./100 c. c., and a glucose tolerance test was normal. Basal metabolism was minus 23. She was given 11 deep insulin shocks, the first deep shock at 105 units. She gained 6 pounds, her appetite was improved, and this improvement in appetite continued. She became more social, and put on make-up, but a year later is still claiming that she is not well, and cannot be married until she gets well. Her boy friend, however, is still waiting for her.

This was a very difficult case to handle, but she did respond after deep shock therapy with insulin. Until she had insulin shocks, we could not get in contact with her.

Case 7 (*Hospital No. 217,386*).—Doris J. had been sick for 15 years, when she entered the hospital because of lack of appetite and weight loss. During the previous five years she had been much worse and had lost 17 pounds. Her present difficulty seemed to be caused by the need for taking over the housekeeping, due to her mother's illness. She remembered her father only vaguely. He died when the patient was 8 years of age. The mother and the five children ran the farm. She was very capable, energetic, a good business manager, and accomplished a great deal. However, she was domineering and dogmatic. The patient, the youngest child, and ten years younger than the next sibling, was always known as the mother's baby. She was dependent. She enjoyed her childhood and got along socially in spite of her mother's objections. From the time that her mother objected to her first high school love affair, she began to withdraw and became a homebody and mother's helper. At first she gloried in the renunciation of her own pleasures to serve her mother, but gradually she began to feel the situation hopeless, and had thoughts of suicide. Sex knowledge was obtained from friends at school. She thought intercourse demanded great strength, and she felt that she did not have the strength for it. She had necking parties with several boys, and desired male company but had little sexual reaction to men, being always frigid and undersexed. She had had persistent loss of appetite practically all of her life. This had been accompanied by vomiting since the onset of menses. Menstruation had always been regular but painful and scanty. She had a poorly nourished asthenic build, a weight of 83 pounds, and a height of 5 feet 6 inches. Glucose tolerance test was normal. Basal metabolism was minus 22 to minus 32. She had had psychoanalysis without improvement, eight electro shocks gave elation, but she soon returned to her former pattern. Testosterone, progesterone, and thyroid were given without improvement. Insulin produced deep shock, at 115 units. She had 29 deep shocks which resulted in a weight gain of 23 pounds. There was a great improvement in appetite, which diminished two weeks later, but was still better than before treatment. The patient still had very little insight into her condition in spite of every effort to make her understand it. However, she had gained a great deal after the insulin shocks in physical strength and well being.

This represents a very severe case of long

standing which did improve under deep shock therapy. The patient still is malnourished and has many symptoms of starvation.

Case 8 (*Hospital No. 218,234*).—Mrs. John C. was 30 years old, and the mother of one three-year-old child when she entered the hospital on September 29, 1945, because of nervousness, inability to eat, and weight loss. She had been sick for two years. She was 4 feet 11 inches tall, and weighed 76 pounds. The patient was closer to her father than her mother and claimed to be more like him. She felt very sorry for him because of the way her mother treated him. The father was an alcoholic. The mother, on the other hand, aroused a fear reaction in the patient. The patient never got along with her, and so she was brought up by doting grandparents. She disliked her mother, but felt very guilty for it as she felt that she should love her mother and father instead of her grandmother. She was very energetic, highstrung, overactive, dependent, and subject to temper tantrums. The patient had some difficulty with sex relations from the beginning of marriage. Since the baby's birth, she claims that she "could live without sex." During pregnancy she was very comfortable and happy. Menses started at 13 years of age and she was terribly frightened by this. The flow had always been scanty, and cramps severe. Her periods were irregular. Laboratory studies on admission showed a fasting blood sugar of 80 mgm./100 c. c. Tolerance test showed a moderate sensitivity to insulin. Blood bromide was 250 at the time of admission. Basal metabolism was plus 1. Because of her insulin sensitivity, she was treated by psychotherapy alone, and developed a great deal of insight and understanding. She gained 5 pounds in weight.

The characteristic of this case was the patient's great energy. She could not keep still, and was constantly under tension. She had a return of appetite and was able to eat a diet of 3,400 calories when she left the hospital. I believe if she keeps this up for six months, that she will certainly stabilize her reaction.

Case 9 (*Hospital No. 216,909*).—Miss Avis H., a white school teacher of 31, unmarried, was admitted to the hospital August 22, 1945. She had been suffering from nausea and vomiting and lack of appetite for 18 years and her condition has been worse for the preceding five or six years. The onset of menstruation seemed to be the precipitating factor. Her first serious attack occurred during her freshman year at college. Her father was very quiet and reserved. Her mother, a great talker, over-protective, and the ruler of the household, always urged the patient to socialize and always urged her to eat. The patient had been teaching the fourth grade for eleven years. She said, "I have always been shy and too quiet." She never mixed, so it was very difficult for her to make new acquaintances. Consequently, she had few friends. She never learned to dance and never had a boy friend. Under sodium amytal, she told of some mutual masturbation at the age of 12. She had some exploratory sex play with girls, but never any sex play with boys. Her menstrual periods started at 16 years of age, and were very irregular for the first ten years. She has had "cramps and blues" for the past eight years with each period. She was poorly developed and nourished, and had a rather silly attitude. Her thyroid showed a minimal diffuse enlargement. Her weight was 100 pounds. Her basal metabolism was minus 5. She was given intensive psychotherapy with narco-analysis, and under this developed a great deal of insight with general improvement in appetite and attitude. There was a five pound weight gain in the hospital.

This patient showed the value of narco-analysis carried on in an intensive fashion. She also responded to hypnosis in the treatment of her vomiting. Under analysis, she showed a great deal of hostility to her mother.

Case 10 (*Hospital No. 196,585*).—Mrs. Edward L., age 27, has one child five years old. She has been suffering from weight loss, nervousness, inability to eat, and occasional vomiting since her child was born, and since they moved away from her home. She was always considered the pet of her father who had a good personality, who hated to offend anyone, and who never was strict with his children. The mother, very strict and austere, told them what was right and wrong. The patient was dependent in the sense that she went home to mother and daddy whenever she encountered trouble. Her sex interests were quite limited. She was always popular with boys, but was never particularly interested in them. Her menstrual periods had been normal, but she bled continuously for three months after the birth of the child. She was malnourished, and her weight was 91½ pounds. Fasting blood sugar was 79. Basal metabolism was normal. She was tried with intensive psychotherapy, but no insight was developed, and there was no improvement in her condition at the time of discharge from the hospital.

The factors common to all the cases are summarized in the tables.

MEDICAL HISTORY

(A) In addition to the anorexia, nausea, and weight loss most of the patients have had vague somatic complaints of one kind or another since adolescence.

(B) Menses: difficult onset, dysmenorrhea, irregularity, and scanty flow. Menstrual difficulties not alleviated by endocrine therapy.

Table 1

They all had vague somatic complaints since childhood. In all there were definite menstrual irregularities not checked by endocrine therapy.

PHYSICAL AND LABORATORY FINDINGS

(A) All cases have asthenic build, normal secondary sex characteristics, well proportioned but malnourished. Hirsutism is present.

(B) All cases show weight loss since onset of illness (10 to 68 pounds).

(C) In 5 cases the basal metabolic rate was low (minus 11 to minus 23). In 3 cases it was normal (2 not done).

(D) In 6 cases insulin tolerance was low (4 not tested).

(E) In all cases urine and blood were negative.

(F) In 8 cases skull x-rays were negative.

Table 2

Physical and laboratory findings were all characteristic of the syndrome, except that in three cases the basal metabolic rate was normal. These tests were taken, however, after the patient had gained weight, and only indicate that the basal metabolic rate is usually lowered by starvation.

SOCIAL HISTORY

Father: "nervous," ineffectual, the submissive parent. Thought to be "kind and nice" by the patient.

Mother: dominant parent, over protecting. Assumes both father and mother role.

Siblings: no common factors.

Personality of patient: dependent, some difficulty in socializing, shy and retiring, definite lag in psychosexual development, frigidity.

Table 3

Table 3 shows the common factors in the social history. There was nothing here at variance with the usual pattern. Even the patients who were married and had a child still denied any sexual pleasure or interests. While carrying the child, they were usually quite comfortable and happy.

PSYCHOLOGICAL STUDIES

(A) All patients have normal intellectual capacities with no reduction of intellectual efficiency.

(B) The Bell Adjustment Inventory shows total adjustment to be very unsatisfactory. On the Bell all patients checked the following items: anorexia, fatigue, weight loss, G. I. symptoms, and insomnia. They often get upset, are sensitive, tend to worry, have many fears, and get discouraged.

Table 4

RORSCHACH FINDINGS

(A) Five records show marked retardation of emotional development. (R less than 20; F per cent 31 to 38; FK and FC less than one; FM greater than M; FC less than CF; A per cent 22 to 45; W greater than one-half M; popular responses less than 5; and F level popular or superficial.)

(B) Two cases give essentially psychoneurotic records. (F per cent over 50; A per cent over 60; popular responses 5; color and shading shock; cautious use of color.)

Table 5

Psychological studies on seven of these patients included the Wechsler-Bellevue and the Shipley-Hartford scales in order to determine the level and efficiency of intellectual function; the Bell adjustment inventory as an indication of what the patient thought her main difficulties to be; and the Rorschach to show the basic personality.

The Wechsler-Bellevue and the Shipley-Hartford scales showed that all of these patients have average normal intellectual capacities. The intelligence quotients ranged from 90 to 114 with a mean of 103. The conceptual quotients on the Shipley-Hartford were within the limits of normal in three cases and 85 or below in four. Reduction of intellectual efficiency was confirmed by the Wechsler-Bellevue in only one case, but not in the other three. Therefore, it is felt that the low conceptual quotients in these cases represent a tendency of the patient to give up easily when problems become difficult for them, rather than a real reduction of capacity.

The scores on the Bell adjustment inventory showed average home adjustment, very unsatisfactory health adjustment, a marked tendency to be socially retiring; and a very unsatisfactory emotional adjustment. A detailed analysis of the responses shows that at least six and usually all seven of the patients checked the following items in each of the different areas of adjustment. There were no common problems relating to the home situation; on the other hand, in all

of the cases physical complaints included anorexia, constant fatigue, loss of weight, various gastro-intestinal symptoms, insomnia, and the need of frequent medical attention. Under social adjustment we find that these patients do not like to participate in group activities. Emotionally, they are unstable. They tend to have swings of mood without apparent cause, to get upset easily, to be greatly disturbed by criticism, and to worry over possible misfortune. Their feelings are easily hurt. They often feel "just miserable," get discouraged easily, have groundless fears, cry frequently, and often feel lonely even when they are with people.

The Rorschach records of five of these patients show remarkable agreement. The total number of responses is somewhat reduced and ranges from 9 to 20 with a mean of 14. The concepts are either superficial or of low popular level with little organization or elaboration. The number of form responses ranges from 31 to 38 per cent and the ratio of pure form to differentiated shading responses is less than one. Animal movement concepts are given three times as often as human movement responses. The color area shows an increase of CF over FC in the ratio of three to one. The percentage of animal concepts ranges from 22 to 45; the relationship of whole to human movement responses is approximately five to one; and the number of popular responses is less than five in each record. Neither the introversive-extroversive relationship (the erlebnis type) nor the ratio of wholes to details shows a constant trend.

The total picture, then, is that of an immature and somewhat colorless personality which tends to be unresponsive to the more subtle meanings of emotional stimuli and to react to situations in an essentially direct and uncomplicated way. The inner life is poorly integrated in that there is an inability to accept and utilize the instinctual drives in a constructive and satisfying manner. Emotional response to the environment is impulsive and primitive. The thinking of these patients is superficial and unimaginative and they have little real drive for intellectual achievement.

On the other hand, two of the records differed from the above five in that the percentages of pure form responses and animal concepts were above 50. In both cases the number of popular responses was five. One patient did not use color at all, while the other gave only two cautious color responses, color and shading shock being present in each case. These two records show an essentially psychoneurotic adjustment in contrast to the other five records which give a picture of an emotional development that has not matured beyond the stage of puberty or early adolescence.

Under "C" in *Table 6*, we have four cases where psychotherapy alone was used. Three of these showed no great gain in weight or appetite, but a moderate increase in insight. The fourth case was not only refractory to insulin but also was not responsive to psychotherapy. She was a total failure. Under "B" in the table is shown the one case that was treated by ambulatory insulin. Along with the insulin therapy, extensive psychotherapy was used in the form of narco-analysis. There was a slight gain in weight and in insight. The cases treated with deep insulin shock showed a marked gain in weight. Twenty-five pounds in three weeks was the record. Another case gained 23 pounds in the same length of time. Their appetites improved and remained improved. Their food intake remained nearly normal, but the deep shock had no effect on their personality pattern. They were still pubescent in their attitudes. They resisted with even greater fervor any explanation of their anorexia on a psycho-dynamic basis. Certainly the results were far less satisfactory than one should expect to obtain after insulin shock in incipient or mild cases of schizophrenia. We can conclude in regard to insulin in small prepandial doses used as an appetizer, that it is of no avail in this disease. Ambulatory insulin has very little if any value over the simple routine of the ward, where forced feeding can be used,

RESULTS OF THERAPY

	No. of cases	Weight gain	Appetite	Food intake	Insight
(A)	Insulin shock plus psychotherapy				
	5	--	--	--	0
(B)	Ambulatory insulin plus psychotherapy				
	1	--	--	--	--
(C)	Psychotherapy alone				
	4	--	--	--	--

Table 6

or tubing can be resorted to, if necessary. Deep insulin shock, however, breaks the anorexia vomiting pattern, leads to weight gain, and a return of normal eating habits with appetite. This picture is maintained over several months. Yet there is no change in the patient's fundamental reaction. They are still Peter Pans refusing to grow up. They want to be dependent and seek assiduously for some somatic label for their abnormality.

In conclusion, we have discussed ten cases presenting the syndrome of anorexia nervosa. The characteristics of this condition were found in the medical history, the laboratory and physical findings, as well as in the social history. These findings were amplified by psychological tests. The Rorschachs can practically be superimposed, one on the other, as the responses are practically identical. They indicate immaturity, above everything else, and suggest that the emotional development of these patients was checked at puberty. While they have not gone forward toward adult life, they have not on the other hand regressed. This is most remarkable in the laws of human development, because usually those that do not go forward very soon regress or dilapidate.

Deep insulin shocks were given to five of these cases, until the habit of anorexia was broken. They gained weight, appetite, and ate normally, but there was no fundamental personality change. When compared with the five cases in which psychotherapy without shock was used, they seemed to be more deficient in insight at the time of discharge. This result seems to us to indicate that anorexia is not an incipient or mild form of a schizophrenic reaction. Also deep insulin shock may be used in anorexia nervosa to check the refusal of food by the gastro-intestinal system, but this must be followed by extensive psychotherapy if treatment is to be successful.

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DISCUSSION (*Abstract*)

Dr. J. A. Shield, Richmond, Va.—Dr. Wilson has quite rightly pointed to the differential between the psychogenic factor of anorexia and Simmonds's disease with its pituitary or polyglandular disturbance. It is necessary that this differential diagnosis be made.

With Simmond's' disease, the prognosis is not good, of course. As long as we can keep people with Simmonds's disease under treatment, we can sometimes get them to gain up to a normal weight and maintain a fair metabolic level. We have seen them gain from 90 pounds to 150 pounds; but when they go out of the hospital, they do not maintain this weight gain and capacity to function; while with the group of cases that Dr. Wilson has brought up for discussion today, if we are able to straighten out their philosophy of life and build them up, we are able to get a permanent result.

I should like to ask Dr. Wilson about the temperature curves in these persons. In Simmonds's disease, of course, we have the tendency for low temperatures and also the loss of hair. We should like to have any other suggestions or any other ideas he may be able to give us to enable us to differentiate these two diseases in order to direct our therapy.

Dr. D. L. Sexton, St. Louis, Mo.—I am interested in this subject from the standpoint of the end effect on the endocrine structures.

Psychiatrists have referred these cases to us because of the profound functional letdown that simulates severe hypophyseal under-function. We have tried to improve them with thyroid and estrogen therapy, but we have not helped them, as has been Dr. Wilson's experience. We think we have helped some of them with supportive adrenal cortical therapy.

A patient whom I have in mind did very well in a few weeks on salt (sodium chloride) therapy, and separation from her troublesome husband. I am sure this latter move straightened out her emotional difficulties.

At the present time we have a patient whom we have had under observation for about five years. We have not been sure whether this patient was a case of Simmonds's disease or anorexia nervosa. She has many of the characteristics of anorexia nervosa. She has shown schizophrenic traits for which she was confined in our city sanatorium and she did improve while there. I must check to see if she had shock therapy. Right now we are treating her as Simmonds's disease, and she has improved on a therapeutic plan which includes testosterone, 150 milligrams weekly; desoxycorticosterone in good doses and small doses of thyroid. We are helping her much more by this plan than by any other plan of therapy we have used.

I should like to ask Dr. Wilson if his five patients did not eventually take on weight.

Severe disturbances of the endocrine system often bring these patients to the endocrinologist.

Dr. Barbara Jean Betz, Baltimore, Md.—I should like to comment upon the very interesting table which Dr. Wilson threw on the board with the pluses under deep insulin and ambulatory and psychotherapy.

I should like particularly to comment on the one zero which was present and which was under insight, with the deep insulin patients. My own reaction in seeing that table was that the zero might be misleading in its implications and indicate that the patients had made no particular advance in the line of personality adjustment, although their weight and somatic reactions had improved.

I wonder whether that zero deserves further consideration and whether insight in itself should be the complete criterion of whether the patients improved or not. I raise that point because my own feeling, from using insulin and from reading reports of other people who have used insulin, is that the drug itself is not the whole beneficial agent in the treatment; but the setup of the insulin treatment situation, with the relationship to the nurses and physicians and so on may in some way supply something to the patients in terms of their emotional and very childishly dependent needs.

I should be interested to know whether a Rorschach was done upon these patients after their improvement and whether there was any shifting at all from the original rather stereotyped kind of response, which might give a cue to the possibility that something had happened beyond the zero.

Dr. Philip Burwell, Montgomery, Ala.—I am just an intruder here. I am a surgeon who came to hear the psychiatrists. We have this problem in surgery a great deal and I should like to ask Dr. Wilson how many abdominal operations these patients have had. We find that these are mostly the people who have had gallbladders and appendices removed. Usually they have that done before they go to the psychiatrist to be cured.

Dr. Wilson (closing).—My impression is that the temperature is usually practically normal in these cases.

I think there is a contrast, Dr. Shield, between Simmonds's disease and the anorexias. There is no reason why they should not have a low temperature, as you know; but I do not believe you get a characteristically low temperature.

On the loss of hair, Escamilla has written at length on the differentiation between Simmonds's disease and this condition, as have others. The falling out of hair is one of the definite points of differentiation between the two diseases.

Berkman summarized my present attitude in his last paper when he said that the differentiation between the two diseases is not so serious as the differentiation between anorexia and some sort of gastro-intestinal disorder. Gastro-intestinal disorders such as ileitis or duodenitis can be more confusing.

We are tempted to give thyroid, of course, but thyroid just causes a delay in the gain of weight as a rule and does not help. I was glad to hear that Dr. Sexton also has found that it is not of value.

The fact that he has used many different glandular products suggests that none of them is of great value. We used adrenal cortical extract in one case without beneficial results. The use of salt solution would make me feel that psychotherapy probably was the most important part.

We find that hostility, ambivalence towards the mother, is the most important thing. Under "amytal," these patients will show a great deal of hostility towards their mothers, while on the surface, superficially, they are dependent, very loving, and show an entirely different picture. If you can get that hostility to come to the surface and come out, you will get somewhere with them.

Dr. Betz' criticism of the chart is absolutely correct. I fixed the chart as it was in order to differentiate the cases. It is perfectly true that with the insulin there are certain personality gains that we could not show, but understanding of the causes of their own trouble, the reception of the psychodynamic attitude is more difficult apparently after insulin than it is without it.

These cases have not many abdominal operations, I think, because many of them start their illnesses at an early age, and, therefore, escape the mutilations that older psychoneurotics have.

STATE MEDICOLEGAL EXAMINERS*

By ROBERT A. MOORE, M.D.
St. Louis, Missouri

As a pathologist I have for some years come in contact with the coroner. One of my first contacts was also an unfortunate one. After showing the coroner what I thought was a beautiful demonstration of paradoxical embolism of the left coronary artery (incidentally, the only instance I have ever observed) he went into the next room and signed the death certificate "pulmonary embolism." And, he was a physician. When I questioned his accuracy, the answer was: "Paradoxical coronary embolism is too complicated, we must have a simple cause of death."

Recently we in St. Louis have had national publicity on what has come to be known as the "Melendes Case." Briefly, a man was arrested, and placed in jail. The next day he died. The coroner investigated, and signed the certificate as a natural death. The body was sent to a medical school for dissection purposes. Several weeks later a judge became curious, and ordered another autopsy. A pathologist reported that the body was bruised from head to foot. After hearings before no less than five Grand Juries and much newspaper publicity, the police were exonerated. An editorial in the St. Louis Post-Dispatch was entitled, "Not Guilty, But Don't Do It Again."

One of the grand juries recommended that the medical profession, and the legal profession study the matter, and determine whether or not there is some better way than the coroner system for the investigation of suspected violations of criminal law. I was asked to act for the medical profession. There is not time to tell you of all aspects of what has happened in the last two and a half years. If I were a master of the language I could give you a far more interesting talk on, "Adventures of a Mere Pathologist in Politics." It has been a most intriguing activity, and I recommend it to you as an avocation. When one leaves the so-called ivory towers of a university, and wanders through the halls and offices of the state legislature, one enters a new world of practical realism. I might just say that I have not been disillusioned, my confidence in democracy is still unshaken. However, this is a scientific meeting, and I shall confine my remarks to four principal aspects of the contribution of science to the administration of criminal justice.

(1) What is the problem?

(2) Who is now doing the work?

(3) How much does it cost?

(4) How can the work be done better?

Each will be dealt with as concerns the state of Missouri.

WHAT IS THE PROBLEM?

Repeatedly in my conversations with members of the constitutional convention, and the legislature, the remark has been made, "Why bother. We do not have murders in the rural counties of Missouri. Everyone knows everyone else." For some time I could answer this only with specific examples such as the one figuratively and literally unearthed by our recently retired state health commissioner, Dr. Stewart. For over fifteen years a dear old lady in a rural county helped in families in distress, and was not detected until she had poisoned some eighteen people with arsenic. However, we finally collected statistics which prove that Missouri needs more adequate investigation of those who die.

Are we in Missouri so temperate that there should be a difference of 5.6 and 0.8 per one hundred thousand population in the deaths from alcoholism in New York City and Missouri. In Newark the figure is 3.0, and in Massachusetts 12.8. Cleveland is even more temperate than Missouri with only 0.5. Maybe the good old Midwest has a sobering effect on people, but it also might be significant that those cities with a high figure have medical examiners and toxicologists, and those with a low figure have coroners.

The statement that there are few murders in rural Missouri is not borne out by vital statistics. Comparison of the urban and rural regions of Missouri and Massachusetts shows about the same number of suicides, but far more homicides in Missouri, especially in the urban part. Another category of interest shows a similar situa-

*Chairman's Address, Section on Pathology, Southern Medical Association, Thirty-Ninth Annual Meeting, Cincinnati, Ohio, November 12-15, 1945.

tion. As we in Missouri have acknowledged with a hanging head for many years, there are more cases of most infectious diseases in Missouri than in other states with larger appropriations for public health.

In summary, the people of Missouri kill themselves about as often as those in Massachusetts, but far more people kill someone else, and catch measles and tuberculosis in rural Missouri than in rural Massachusetts. Is it too far fetched to conclude that crime is a disease like measles; and that it can be controlled by proper measures. Perhaps it is pertinent that Massachusetts with a low homicide rate, has had an efficient medicolegal examiner system since 1888, and Missouri with its high rate has coroners elected because of their political affiliations. A sword of Damocles, representing vigorous administration of criminal law, hangs over the head of the potential criminal where there is efficient scientific investigation of crime.

WHO IS NOW DOING THE WORK?

There are 114 counties and the city of St. Louis in the state of Missouri. Hence there are, or should be, 115 coroners. In 1944 there were five positions vacant: some because no one could afford to run for an office that paid less in four years than the expense of a campaign. Forty were physicians, osteopaths, chiropractors or veterinarians; at least one-third then, had more than a speaking acquaintance with death. The remaining two-thirds were undertakers, furniture dealers, business men, salesmen, and so on. At least undertakers can make a financial balance inasmuch as proper and subtle persuasion can bring to the coroner-undertaker funerals of sufficient number to defray the expenses of a campaign. In one of the larger counties of Missouri, it is estimated that the position of coroner, if held by an undertaker, is worth $10,000 a year in salary and increased business.

In the six large urban counties in which one-half of all deaths in Missouri occur, three coroners are physicians, and three are not.

For how long will the people allow governmental officials who collect evidence that may mean the difference between prison or death and acquittal to be elected with no necessary qualification of ability or experience?

HOW MUCH DOES IT COST?

In business, accurate cost accounting is synonymous with profit. Yet in many branches of government few have any ideas of the cost of this or that service except in total budget, and not always then.

In 1944, the Community Health League of Missouri authorized a grant to study the cost of the coroner's office in the state. Manifestly it was not possible to visit all 115 coroners. Before we started, one shocking reason for this conclusion became evident. In many counties of Missouri, the coroner treats his records as personal property. Inasmuch as there is a constitutional prohibition against immediate reelection of a coroner, it frequently is impossible to secure either the magisterial, the judicial, or the financial records of any coroner except the incumbent.

With the advice of Professor Lee of Washington University, a former state superintendent of schools, we selected twenty-two typical rural counties and six urban counties for study. Each of the rural counties is similar to the surrounding counties in density of population, assessed value per acre, type of agriculture and industry, and social and economic level of the inhabitants. The calculation of an estimate for the district and the entire state then becomes a matter of simple arithmetic.

For example, in the northwest corner of the state are Nodaway, Andrew, Atchison, and Holt counties. Our investigator, a young lawyer, went to the county seat of Nodaway county. He searched the records for 1936 and 1941 both reasonably normal prewar years, and found that in these two years, there was an average of 295 deaths and 23 investigations by the coroner, at a cost of $490. In the four counties there were 678 deaths. The probable number of investigations was then 678 over 295 of 23, or 53, and the estimated cost was 53 over 23 of $490, or $1,125.00. This was done for twenty-two type rural counties, and for the five large urban counties and the city of St. Louis. In the 109 rural counties on the basis of this type of study in 22, there were in one year 21,926 deaths, of which 1,469 or 6.7 per cent were investigated by the coroner. The range of per cent investigated was from three to fifteen.

In five urban counties (Buchanan, Greene, Jackson, Jasper, and St. Louis) and the city of St. Louis there were 21,088 deaths, of which 3,524 or 16.7 per cent were investigated by the coroner. The range was eight to twenty.

Manifestly, there is a wide discrepancy in the effectiveness of this form of governmental service between rural and urban districts, and within both. Is this not sufficient evidence to change the direction from the county-level to that of the state. In many services, notably, roads and schools, the change to state supervision and financing, has been made during the past few decades in order to secure equitable distribution, and to give help to the less fortunate regions. The prosecution of the criminal and the protection of the innocent person by scientific crime detection are certainly as important as broad smooth highways on which people, with or without the stimulus of alcohol, delight killing themselves and others, and thus making more work for the coroner.

The cost to the 1,953,245 rural population was $24,376 or 1.2 cents per capita, and to the 1,851,419 urban population $91,127 or 4.8 cents per capita. This serves only to emphasize the difference in service rendered to the two groups.

The average total cost of the coroner's office in Missouri in 1936 and 1941 is thus estimated to be $115,500 with a range of cost per case investigated from $16.59 in rural districts to $26.14 in urban districts.

HOW CAN THE WORK BE DONE BETTER?

With the sum of $115,500 it would be possible to establish a system of state medicolegal examiners, staffed with able men, trained and experienced in the scientific detection of crime.

I shall not bore you with details or with the verbosity, redundancy, and circumlocution of the legal phraseology necessary to enact into the law the ideas expressed. For those interested, I have a copy of the proposed law, a synopsis of it, and two propaganda pamphlets. If those who read this look with favor on the concept I shall be glad to send them copies of this material.

The proposed law provides for:

(1) Repeal of Chapter 91, Sections 13227 to 13268 inclusive relating to inquests and coroners and revision of the 58 statutes which mention the coroner.

(2) A bureau of medicolegal examiners in the new Department of Public Health and Welfare.

(3) An advisory state board of medicolegal examiners composed of three lawyers, three pathologists, the state health commissioner, and the superintendent of the state highway patrol.

(4) Appointment of a chief state medicolegal examiner, and not more than three associate and not more than ten assistant state medicolegal examiners.

(5) State medicolegal examiners shall be licensed physicians and shall have had not less than two years of postgraduate training in pathology.

(6) A state office in Jefferson City in charge of the chief state medicolegal examiner, branch offices in the city of St. Louis and in Jackson County in charge of an associate state medicolegal examiner, and branch offices in strategic points through the state in charge of an assistant state medicolegal examiner.

(7) A county medicolegal examiner in each county who shall make preliminary examinations promptly.

(8) County medicolegal examiners shall be physicians.

(9) Appointment of specialists such as chemists, photographers, and so on.

(10) The conditions under which the county and state medicolegal examiners shall investigate a death. Briefly these are: whenever there is reasonable ground to believe that a person died

(a) of violence,

(b) of casualty,

(c) of suicide,

(d) suddenly when in apparent health,

(e) when unattended by a physician,

(f) in prison,

(g) in an institution maintained in whole or in part at the expense of the state,

(h) under unusual or suspicious circumstances, or

(i) and the body is to be cremated or transported out of the state.

(11) Penalties for interference with activities

of the medicolegal examiners, punishable as a misdemeanor.

(12) Performance of autopsies when necessary to determine the cause of death.

(13) Availability of all mediocolegal examiners as witnesses in all courts.

(14) Inquests when necessary or desirable in the opinion of the prosecuting attorney.

(15) Administration and establishment of public morgues.

(16) Cooperation between the state medicolegal examiners and other agencies of the state government, especially with the state department of health in the investigation of epidemic disease.

(17) Cooperation between the state medicolegal examiners and hospitals throughout the state to promote better medical care in rural counties.

(18) A merit system for the employees of the office of state medicolegal examiners.

(19) Impartiality of the state medicolegal examiners inasmuch as all evidence collected by them is equally available to defense attorneys for examination.

You may ask, and I have many times, if all this is true, why do we still have coroners in forty of our forty-eight states. Perhaps in the postwar years of the atomic age good government and the good of all the people will finally supersede the vested interests of the few who hold on to an outmoded service for their selfish benefit or that of their political party.

DISCUSSION (*Abstract*)

Dr. Douglas H. Sprunt, Memphis, Tenn.—What plans are you making for relating the medical examiner to preexisting crime detection agencies? In many places with the old coroner system the district attorney's office has, with the aid of the F. B. I., set up modern crime detection laboratories. The medical examiner should be closely related to these laboratories.

Dr. Roger D. Baker, Birmingham, Ala.—I should like to put another question at the same time. How will you tie your system in with the medical schools?

Dr. Moore.—First to Dr. Sprunt's question I may say that the coroner in Missouri, differing from many other states, cannot be by-passed. He has the right to order an autopsy, not the prosecuting attorney as it is, for example, in Ohio. At least, about ten years ago the prosecuting attorney in Ohio was the only one who could order an autopsy. In Missouri, the coroner is the only person who can order it.

As to the second part of your question, how is it to be tied in with present police activities: I think that we need not worry about that except in the city of St. Louis and in Jackson County inasmuch as neither the police nor the coroners have ever bothered to take photographs or anything of that sort. The first photographs taken by the coroner's office in St. Louis County, not the city, were taken just about two years ago, except when something was very important. At that time we established in St. Louis County a pathologist to the coroner.

There must be close cooperation between the medical examiner and the police, the sheriff's office and the state police. I think that is something that should be worked out on a local basis. If a particular police department has facilities for photographs, let them do it. If it has not, let the medical examiner provide those facilities.

For a tie-in with the medical school, I do not at the moment anticipate any particular affiliation. This is a governmental function and should be run by the Government and the medical schools should not control it.

Dr. W. D. Forbus, Durham, N. C.—Where are you going to find the pathologists to do this work? Have you enough in Missouri?

Dr. Moore.—There is a constitutional provision now in effect in our state that professional personnel need not be drawn from the residents of the state. I think we can get pathologists over the nation if we pay enough in the way of salary.

Dr. Forbus.—If you ran your business for $115,000, as I remember it, do you think that you would be able to accomplish a great deal?

Dr. Moore.—Yes, I do. I think by setting it up in the proper way, we can pay the chief medical examiner, that is, if the rural legislatures do not object and they probably will, eight or nine thousand dollars a year, the associates seven thousand and the assistants six thousand.

Dr. Forbus.—Full time?

Dr. Moore.—Yes, sir, full time. They will be prohibited by the law from doing anything else, especially in appearing against the Government in this state or in any other state. This gets away from the idea that the medical man can one day be on the side of the Government, and the next day on the other side. The medical examiners will represent the people. They will have no partiality on either side.

Dr. Oscar B. Hunter, Washington, D. C.—I should like to ask if you are going to tie this in with the health department or public health. Under these conditions you would have them testifying against themselves; would you not? They would be officers of the state, and in that respect, they would be to a certain

extent under the control of the department of health, would they not?

Dr. Moore.—Under the commissioner.

Dr. Hunter.—I notice you said the commissioner. Would he not have full authority. Would they be an independent body?

Dr. Moore.—Semi-independent. There is background for placing them in the department of health entirely aside from certain other considerations. The background is that in the new constitution of our state, there may be only fourteen departments and there may be no independent agencies. Everything in Government has to be placed in one of those fourteen departments. That is the commanding reason for putting it in the department of health and welfare.

It has to be administered in some department. I am hoping that it will have a semi-independent existence through an advisory board of physicians, pathologists, and lawyers. This Board would advise the state health commissioner on the administration of this part of the department.

Dr. Alfred Blumberg, Fort Bragg, N. C.—In the course of resolving a legal controversy it is quite common to find a medical expert to testify in support of either plaintiff or defendant. What standing in court would such an expert's opinion have against that of the official medical examiner, and, vice versa? Judges repeatedly note that "with all due regard to the sincerity of the medical witness it is quite disconcerting to realize that medical opinions often are in conflict and usually in favor of the client who employs the medical expert."

Dr. Moore (closing).—I should like to mix a bit of idealism with realism in connection with the political problem. Some day I hope that the state medical legal examiners will so establish a reputation for impartiality that they will be witnesses for the court, not witnesses for either side. That, however, is a long way off.

A PROPOSED PROGRAM FOR MORE ADEQUATE MEDICAL CARE AND HOSPITALIZATION IN NORTH CAROLINA*

By W. Reece Berryhill, M.D.†
Chapel Hill, North Carolina

For the past eighteen months there has been a considerable interest on the part of neighboring states and other sections of the country in the plans for developing a statewide program in North Carolina in the general field of better medical care and hospitalization. The chairman of the section has requested me to report these developments to date, with a summary of the blue print laid down for the future in the hope that this may be of interest to other states now working toward solution of this important problem.

In 1943 a group of medical leaders in North Carolina long concerned over the problem of medical care in the state, especially with its general inadequacy in quantity, in quality, and in the economic and physical accessibility to large numbers of the population, began a series of conferences to determine what steps at the community and state level could be undertaken in the postwar period to eventually effect a solution in the best interests of the public.

The Governor, the Honorable J. M. Broughton, was actively interested in the general health problems in the state. After conferences with medical leaders and many prominent citizens, in January 1944 he proposed to the board of trustees of the university the outline of a broad, long-term program designed (1) to encourage and aid hospital construction and maintenance in areas of North Carolina now without such facilities and (2) to establish a state university medical center through expansion of the present medical school, including the construction of a state supported general hospital for all classes of patients but especially for the low income groups.

"The ultimate purpose of such a program," said the Governor, "shall be that no person in North Carolina shall lack adequate hospital care or medical treatment by reason of poverty or low income."

"It is believed that the University of North Carolina . . . should join in sponsoring such a proposal and it is felt . . . by many who have given consideration to this matter that the University should have an active part in any plan that is proposed."[1]

This is perhaps doubly significant. The trustees were naturally responsible for the medical school expansion, but it is implied that the state university has a responsibility and an opportunity for service in this area of human welfare, as it does in many others involving the expenditure of public funds for the good of the state.

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†Dean, School of Medicine, University of North Carolina.

After unanimous approval of the program in principle, the trustees authorized the governor to appoint a commission to study the health problems in North Carolina and to report its findings and recommendations to the general assembly of 1945.

This is the genesis of the "governor's plan," as it became known in North Carolina, the most significant and far-reaching development in fifty years, or since the state began the support of public education. A very capable hospital and medical care commission of fifty men and women was immediately appointed representing (1) the medical and allied professions in all branches, medical specialists, general practitioners, public health, medical educators, nurses, pharmacists, dentists, and hospital administrators; (2) industrialists; (3) labor leaders; (4) leaders of farm organizations, men and women; (5) welfare organizations; (6) leaders of the Negro race, (7) of the churches, and (8) of the press.

Except for the purpose of prosecuting a war, probably at no time in the history of the state has a group of responsible citizens representing such widely divergent economic and social interests been brought and held together for a year for the purpose of studying a problem so vital to the welfare of the state. That industrialists and labor leaders, old line Southerners and Negroes, farmers and bankers, sociologists and doctors of medicine could all sit together with a common interest and common purpose is a very healthy sign of progress in the South and is an example of an intelligent approach to many problems affecting public welfare.

In order to study all angles of the problem, the following sub-committees were formed with chairmen whose special interests were in the assigned area of study:

(1) The University Medical School and Hospital;

(2) Hospital and medical care needs for the rural population;

(3) Hospital and medical care needs for the urban and industrial population;

(4) Mental health and hospitalization;

(5) Hospital and medical care programs in other states;

(6) Statistical data and publications.

Time does not permit the recital of the spontaneous public approval in press and pulpit throughout the state, or of the opposition from a section of the medical profession and other sources. Cries of "state medicine," "state bankruptcy" and other slogans were heard not infrequently; and before the study of the commission actually got underway, the source and reason for most of the opposition to whatever future recommendations might be made were pretty well known.

Through long arduous months the subcommittees worked, studied, and debated in an attempt to bring together the many widely divergent interests and points of view into a sound and workable program designed to meet the health needs of the entire state. Advice was secured from various agencies concerned with health programs and hospitalization. The studies and reports made by the Virginia Rural Health and Medical Care Committee, headed by Dr. H. B. Mulholland, proved invaluable to the Committee on Rural Health.

In brief, a majority of the commission believed that it was wiser at this time to attempt a solution of medical care problems on a general basis of voluntary cooperation between all parties concerned, with the government, local, state, and federal, as a necessary supplementary agency. It believed that orderly evolutionary reform with responsibility for and control of medical care on a local level is more in keeping with the American philosophy and ideals of a democratic society. However, it believed that the state must assume some responsibility, possibly through cooperation with the Federal government, in aiding and supplementing local efforts to provide and maintain facilities for the health of its citizens.

"The masses of the people are determined to find some way to work toward the goal set forth by Governor Broughton; i. e., medical security. To fail to help them may leave them to leadership dangerously unsound. Our desire is to help constructively—to cooperate for larger things with existing physicians, hospitals and other medical agencies."[2]

In its final report the commission presented the following summary of its studies:

The situation in regard to problems of medical care in North Carolina differs in no essential

particulars from that in most of the Southern states, except that it stands in a less favorable position than most. In the predominantly agricultural east, the tenant farmer, white and colored, presents the greatest health problem; in the piedmont section, where is concentrated most of the textile and cigarette industry and the wealth, the mill worker; and in the mountain counties, the small farmer. There are no large cities, and 73 per cent of the state's population lives in rural areas, towns of 2,500 and under.

The state is the ninth most rapid growing commonwealth; and in spite of the tremendous benefit from the hospital section of the Duke Endowment in giving financial aid for construction and maintenance of small community hospitals, the rate of population growth has exceeded the rate of increase in medical care and hospital facilities. It is obvious, of course, that the conditions incident to war have not created but rather have exaggerated the gravity and acuteness of the situation.

The following factors are important in the over-all problem:

(1) Shortage of medical personnel and hospitals and their unequal distribution.

(2) The inability of a large number of persons to pay for medical service.

(3) The lack of appreciation of value of good health and lack of information or initiative in how to use facilities now available or that may become available.

In the South in general and North Carolina in particular, there have always been too few doctors and too few of all other types of medically trained personnel. This fact has been emphasized before in this section in relation to the function of the Southern medical schools. In North Carolina in 1940 there was one practicing physician to approximately 1,600 people; 44 other states had a more favorable ratio; 42 states had more dentists; and 37 states, more nurses, including student nurses, per unit of population. Thirty-seven states had lower death rates in spite of the favorable climatic condition and fairly sound stock biologically; 40 states had a lower maternal death rate and 38 a lower infant death rate. The shortage of technicians, qualified superintendents of nursing, dietitians, hospital administrators was more acute.

In the distribution of personnel the situation was even worse; 33.5 per cent of the physicians were in six large urban counties which had only 20.5 per cent of the state's population; only four counties in 1940 had more than 1 physician per 1,000 people, but 43 counties had less than 1 per 2,000 and 3 counties had 1 physician to 5,000 or more. For rural North Carolina there was 1 physician to 3,600 or 31 per cent of the physicians for 73 per cent of the state's population.

In 1940, 41 states had more hospital beds per 100,000 population; North Carolina had only 2.4 hospital beds per 1,000; of these 42 per cent were located in the same six large urban counties; only 4 counties had four or more beds per 1,000; 31 counties had less than 2 beds, and 34 counties had no hospitals. Twenty of these counties are sufficiently populous to require at least a 50-bed hospital to serve the area adequately.

In the final report addressed to all the people of North Carolina, the Commission said:

> "In order both to remedy the most urgent needs of today and work toward the larger program of tomorrow, three things are supremely needed: more doctors, more hospitals, more insurance.
>
> "We cannot have enough doctors without more hospitals . . . nor enough hospitals without greater popular ability to pay for hospital service . . . and such ability to pay on the part of the poorer half of our population is impossible without insurance."

To meet these needs the following measures were recommended, which in the light of proposals considered in other states and in the Federal Congress must seem "conservative," although to the reactionary element, professional and lay in North Carolina, they appeared dangerously "radical" at the time:

(A) To meet the need for more medical personnel, and especially as an essential part of the foundation for a comprehensive statewide hospital and medical care program, it was recommended that the present two-year medical school of the University of North Carolina be expanded into a four-year school with the construction of at least a 400-bed general hospital, available for patients from all economic levels throughout the state but especially for the low income groups.

Additional facilities would be provided for tuberculous patients, and a small psychiatric institution would be developed with emphasis on early mental disorders and on cooperation with the state mental hospitals in a program of mental hygiene clinics throughout the state.

The University Medical Center was visualized as an integral and essential part of any program designed to provide better medical care in the state (1) in providing opportunities for training state residents in medicine, nursing, medical technology, dietetics, hospital administration, and possibly later in dentistry; (2) in improving the quality of medical care through a program of continuation courses for practicing physicians in the state, at the center but especially through carrying postgraduate instruction to the small hospitals and health centers in the more rural and medically isolated areas; and (3) in supplying, as a part of a medical care and an educational program, a consultation and teaching service by members of the university staff to the smaller hospitals in the form of the services of roentgenologists, pathologists, and clinical specialists. It was believed that through these services the quality of medical care can be improved and standards maintained and that younger physicians will be better satisfied to locate and to remain in smaller communities with assurance of this type of professional stimulation and aid.

Furthermore, it was felt that changing trends in medical education are placing two-year schools under an increasing handicap and that the state of North Carolina faced the problem of either expanding the present two-year school, which has been the largest single source of supply of doctors in the state (approximately 25 per cent), or within the next decade or more withdrawing entirely from the field of medical education.

In order to get more rural doctors it is generally agreed that more capable students from rural areas should be enabled to study medicine. The commission recommended the establishment of a loan fund for promising youths who wish to become physicians in North Carolina, with extra inducements provided for those who would agree to practice medicine for at least four years in rural areas.

(B) In order to insure a more adequate quantity and more equitable distribution of hospitals, it was proposed that the state provide a building fund, to be expended under prescribed regulation by a state hospital and medical care council, for assisting counties and communities to build or enlarge hospital or health centers in areas not adequately served by existing hospital facilities. State aid for this purpose would be available only as a supplement to local efforts and only for building or enlarging publicly owned or non-profit hospitals. It was further suggested that no grant from the state should exceed 50 per cent of the total cost of construction and equipment and that within such limitations the proportion of the grant to the total cost be based upon (1) the economic conditions within the areas to be served, (2) the financial ability of the local governmental unit which would own or operate such an institution, and (3) the availability of funds from other sources, private donations, the Duke Endowment, and Federal grants-in-aid.

It was suggested that such a statewide program to meet the urgent hospital needs should eventually include the following types of hospitals:

(a) A few hospitals of 100 or more beds, complete in all diagnostic and treatment facilities to serve both urban and rural people.

(b) Small county or rural hospitals of 50 beds, including improvement or enlargement of existing facilities.

(c) Health centers of 20 to 30 beds in small rural communities, available to all qualified physicians in the area, to provide simple diagnostic and laboratory aids, emergency surgical treatment, dental service, obstetrical service, a small number of beds for cases not requiring services of a larger hospital, and facilities for the health department to carry on its preventive medicine and educational activities. It is believed that this type of health center or small community hospital is essential for improving the quantity and quality of medical service in rural areas, for attracting younger doctors to such areas, and in furthering health education.

To encourage continuing community pride, initiative, and support, any hospital receiving state aid should remain under the professional, administrative, and financial control of its own

board of trustees elected locally from representative citizens in the community.

To provide for more adequate care of low income persons in hospitals and to aid in the maintenance of the smaller hospitals, it was recommended that the state appropriate $1 per day for each medically indigent person hospitalized in approved hospitals. With a similar amount now provided by the Duke Endowment, a charity patient would be provided with $2 a day toward hospital care, and it was presumed that counties, municipalities, or other sources could make up the balance.

It was recommended that the legislature provide for a permanent state hospital and medical care council of adequately qualified persons, which should adopt policies designed to maintain the highest standards of service, efficiency, and professional excellence in the hospital program and to administer the student loan fund, strict provision being made to safeguard the program from political interference.

(C) To meet the need for more insurance, the commission recommended that the state, through the hospital and medical care council, promote and encourage in every practicable way the development of prepaid group medical care plans, and that the two Blue Cross organizations in the state, the Hospital Care Association and the Hospital Savings Association, be asked to expand the present services offered on an insurance basis toward a more comprehensive coverage. This is particularly important for people in the rural areas who depend so heavily on the general practitioner for medical service.

In the two months between the time the final report of the Commission was made public and the opening of the General Assembly in January 1945, members of the Commission, aided by a committee from the State Medical Society, carried on a campaign of information among the public as well as the medical profession. Speakers presented the recommendations before county medical societies, civic clubs, welfare organization, church groups, etc. The daily and weekly newspapers were of considerable help in this campaign. As a result of these activities, the recommendations were approved, in whole or in part, by 63 of 65 county medical societies, the North Carolina Public Health Association, the State Hospital, State Nursing, and State Pharmaceutical Associations, by the State Congress of Parents and Teachers, State Social Service Organization, many church groups, and by civic clubs in many towns.

There was, of course, opposition from certain powerful groups and interests in the state—some for reasons so obvious as to need no comment, others because of misinformation or lack of information. A new state administration took office in January and immediately announced two fiscal policies, which the legislature approved and which made it impossible to appropriate funds in 1945 for the complete program. These policies were: (a) a provision for retiring the entire general fund indebtedness of the state; after this was done a surplus of over $20,000,000 remains; and (b) in view of the war and the building costs and restrictions, no appropriation for a state building program or for permanent improvements.

The pending Hill-Burton bill in the Federal Congress undoubtedly influenced the legislature to proceed cautiously until it could learn what Federal grants for hospital construction might become available. However, the governor in a special message before a joint session of the House and Senate sponsored a bill embodying the framework of the commission's recommendations, and this was passed. The bill was entitled

"An Act To Provide a Statewide Program of Hospital and Medical Care; To Create the North Carolina Medical Care Commission; To Make Appropriations for Contributions for the Care of Indigent Sick in Approved Hospitals; To Make Surveys and Recommendations for the Construction of Necessary Hospitals and Health Centers; To Provide for the Expansion of the Medical School of the University of North Carolina; To Provide for the Construction of a Central Hospital as a Memorial to North Carolina Dead of World War I and World War II; and Other Provisions Relating Thereto."

This Act provided for a permanent North Carolina Medical Care Commission, composed of representatives elected by the State Medical Society, Hospital Association, Dental Association, Nursing and Pharmaceutical organizations, and the Hospital Section of the Duke Endowment, with appointees from the public representing industry, labor, agriculture, and the Negro, with the secretary of the state board of health

and the commissioner of public welfare as ex-officio members. The duties of the commission were specified as follows:

(1) To work out rules and regulations governing the disbursing of the state's $1 per day appropriation for indigent patients in approved hospitals, provided local governmental units or other sources assume the responsibility for the balance of the costs. For this an annual appropriation of $500,000 was voted.

(2) To begin immediate surveys in all sections of the state to determine: (a) the hospital needs of a county or area; (b) the economic ability of the county or area to support adequate hospital service; (c) what assistance by the state would be necessary to supplement all other available funds to finance construction of new hospitals, health centers, additions to existing hospitals and health centers, in order to provide adequate hospital service for the county or area.

(3) To act as the official state agency to set up and administer any Federal funds that may be granted by the Federal Congress for aid in hospital construction.

(4) To formulate rules for administering the medical student loan fund of $50,000 for students who attend North Carolina schools provided such students shall agree to practice in rural areas for at least four years.

(5) To encourage and promote the development of group insurance plans, Blue Cross or others, that provide for insurance for the public against the costs of illness.

(6) The Board of Trustees of the University was authorized to expand the medical school into a four-year school. But amendments submitted by competing cities for the location of the school provided that (a) a further survey should be made by the Medical Care Commission to determine the best location and that this report should be submitted to the Board of Trustees and (b) that a survey should be made by an out-of-state agency with experience in the field of medical education and medical care.

The commission was appointed this past summer and is now setting up the machinery for carrying out the provisions of the act.

Admittedly, there are many criticisms that could be made of this general plan. It does, however, provide a framework around which the state has committed itself to develop a program for better medical care for all its citizens. For a conservative Southern state like North Carolina to have done as much as this in one year in the midst of a world war is definitely encouraging.

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SOME OBSERVATIONS ON THE Rh FACTOR*

By W. T. McConnell, M.D.,

and

J. D. Gordinier, M.D.

Louisville, Kentucky

In presenting this paper we do not propose to add anything to the current knowledge of this subject. It is not our purpose to report any of the more or less complicated laboratory procedures employed in determining the presence of the Rh factor or the anti-Rh agglutinin. A complete report of the work done on this subject in the past few years would require a voluminous text. It is our hope rather to compile in simple language a condensed summary of facts and conclusions which may be used as a compendium for answering the questions asked, by the patient, of her doctor.

There is probably no complication of pregnancy causing more widespread interest and concern to both the medical profession and laity, at the present time, than the subject of the Rh factor and its relation to pregnancy. There have been a number of excellent articles on this matter in the lay press, and many of our patients come to us with intelligent questions. We find a variety of reactions psychologically among these patients ranging from a healthy curiosity for pertinent information, to a hysteria

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of apprehension, as if some new and deadly disease had just been discovered. If we can answer their questions accurately and simply we will add much to their mental tranquillity, which is a matter of no small importance to the obstetrical patient.

Therefore, we have elected to employ the question and answer method of handling this discussion, avoiding as far as practicable ambiguous and supertechnical terms.

(1) *Question.*—What is meant by the Rh factor?

Answer.—This is a newly discovered factor contained in human red blood cells.

Practically everyone is familiar with the necessity for typing and cross-matching of blood before using for transfusion purposes. It is a well known fact that if the proper type blood is not given, the donor blood will be destroyed by the blood of the recipient. It had also been recognized for some time that in spite of the most meticulous typing, unexplained transfusion reactions did take place. It was further noted that these so called intra-group transfusion accidents occurred frequently with conditions associated with pregnancy.

In January 1940, Landsteiner, and Wiener,[1] reported on an antibody developed in rabbits following the injection of blood of the Rhesus monkey. When tested with human blood a new factor in human blood was discovered, which they called Rh (for Rhesus). In white humans 86 per cent contain this factor, and are designated Rh positive, 14 per cent do not, and are designated Rh negative.

The antibody produced when Rh positive blood is injected into Rh negative blood, is known as the anti-Rh antibody. In the light of this new discovery intra-group transfusion accidents were investigated and in each case the donor was found to be Rh positive, and the recipient Rh negative. Further, the recipient blood was found to contain anti-Rh antibodies which were capable of destroying the donor blood, hence the hitherto unexplained blood transfusion reactions. Levine, Burnham, Katzin, and Vogel,[2] then noted a high per cent of stillbirths in this group of transfusion accidents associated with pregnancy. This led to a new theory of the etiology of erythroblastosis. They believed that probably an Rh positive father mating with an Rh negative mother, will produce an Rh positive infant, because of the dominant characteristic of the Rh factor. The Rh positive blood of the child penetrates the placenta and causes the production of anti-Rh antibodies in the Rh negative blood of the mother. The mother's blood then through the same placental defect, invades the child's blood stream, and destroys the Rh positive blood cells of the child, which results in the condition known as erythroblastosis fetalis.

To go a step further in explaining the mechanism of this theory, the analogy of bacterial immunization may be employed. It is commonly known that the injection of dead, or weakened bacteria into the body of an individual, produces a reaction which tends to protect the persons against disease caused by these particular germs. This is done by the production of antibodies. In a like manner when erythroblastosis develops, it is because the Rh positive blood of the baby, acting in the same manner as the bacteria of a vaccine, causes the production of antibodies in the blood of the Rh negative mother. These antibodies in turn, then destroy the blood of the baby.

(2) *Question.*—A patient is pregnant for the first time, she is Rh negative, and her husband positive, what are the percentage chances for a normal baby?

Answer.—Almost 100 per cent, if the patient has had no previous transfusions, and no placental disease. The incidence of matings in which iso-immunization may take place is 13 per cent. From this, one would expect a higher percentage of erythroblastosis, but a number of factors tend to reduce the incidence: (1) The current tendency toward small families. (2) The inability of many Rh negative women to iso-immunization. It is thought that a previous pregnancy starts the iso-immunization of the mother, and prepares the stage for erythroblastosis in subsequent children.

(3) *Question.*—The husband is Rh negative, and the wife Rh positive. What is the percentage of danger in this condition?

Answer.—None. An Rh positive individual

does not produce Rh antibodies, because in the Rh negative individual there is an absence of the Rh factor, and there is, therefore, nothing to stimulate the production of antibodies.

(4) *Question.*—Is it necessary to check the husband when the mother is Rh positive?

Answer.—No. The answer to question number three, answers this.

(5) *Question.*—When husband and wife are Rh negative, can erythroblastosis in the child be certainly ruled out?

Answer.—No. Erythroblastosis may very rarely occur from blood groupings other than the Rh factor, such as factor 0. If both father, and mother, are negative, the child will not have erythroblastosis due to the presence, or absence of the Rh factor.

(6) *Question.*—Is there any chance of an heredity throwback producing an Rh negative child, when both parents are Rh positive?

Answer.—Yes. There are two types of Rh positive: homozygous, and heterozygous. Homozygous positive, always produces an Rh positive child. Heterozygous positive, contains an Rh negative recessant, and may produce an Rh negative child; but in this child there is no chance of erythroblastosis.

(7) *Question.*—What type of blood should be given a baby with erythroblastosis?

Answer.—The ideal blood would be Rh negative blood, in which there were no Rh antibodies. There are indications from a small number of cases, that the affected infant maintains a higher level of hemoglobin, and red cell count, if transfused with Rh negative blood, the rational of this being that Rh positive infant's blood is being destroyed. If Rh positive blood is given, the antibodies in the baby's blood destroy the cells of the transfused blood, but it may be of some benefit because of the neutralizing of some of the antibodies.

(8) *Question.*—In a case where the mother is Rh negative and has one or more normal children, then has an erythroblastic child, what chance has she for other normal children?

Answer.—Multiparity is a distinct factor in 85 per cent of the cases, according to Javert.[3] The disease usually appears in the second, third or fourth pregnancy. Recurrence has been found to be 100 per cent where the disease has occurred in the first pregnancy, and is 53 per cent when occurring in multiparas. If all babies are Rh positive, the chances are about 90 per cent that the next child will be erythroblastotic, but if one of three children is negative, the chances are about 50 per cent that another child will be negative. If the mother is Rh negative, and the father is heterozygous positive, the mother may have either Rh positive or negative children.

(9) *Question.*—What influence has the Rh factor in causing abortions?

Answer.—It is not apparent at present why the Rh factor should affect early abortions, according personal communication with Dr. Marion Beard. According to A. B. Hunt[4] the Rh factor becomes active in this capacity only in the latter half of the period of gestation. A possible relationship might be found where a mother with a strong antibody titer before the pregnancy, might lose an early pregnancy, especially in the presence of early placental pathology. Javert noted an incidence of abortion of 7 per cent among 50 women before having an erythroblastotic child. The incidence increased to 32 per cent after having an erythroblastotic child.

(10) *Question.*—Can anything be done to change the blood type of Rh negative mother?

Answer.—No.

(11) *Question.*—Can anything be done to reduce, or eliminate the antibodies in a mother after she has given birth to a baby with erythroblastosis?

Answer.—No. But the time factor tends to lower the antibody potency. A two- or three-year period may cause diminution of antibodies to the point where they could cause no trouble. If the antibody titer has been strong enough to produce erythroblastosis, it is not likely that a succeeding Rh positive baby would escape completely all damage.

(12) *Question.*—In a case of a mother producing Rh antibodies during her pregnancy, does a cesarean section at eight months offer the baby a much better chance?

Answer.—The production of Rh antibodies

becomes a clinical entity at about the end of the first half of pregnancy, and increases progressively until term. Therefore, theoretically, at least, the power of the antibodies to destroy the infant's blood cells would be greater at term, than at eight months. If the mother's antibody titer at eight months is very high, a cesarean section would probably offer little hope of giving the baby a better chance, because the damage would probably be severe at that stage. If the titer were weak, but positive, it seems logical that the operation would be of value, especially since placental pathology would be more likely to occur during the last month. If antibodies are absent at this period, there would seem to be no indication for the operation. The value of cesarean section at eight months in the presence of Rh antibodies is still in the experimental stage, and clinical experience alone can determine the final answer.

(13) *Question.*—Of what clinical significance are the Rh factor sub-groups in the outcome of a pregnancy?

Answer.—None, in the light of our present knowledge.

(14) *Question.*—What are the advantages in knowing before hand that the husband and wife are different Rh types?

Answer.—If the wife is Rh negative, this knowledge has several advantages: (a) If a transfusion is needed, it is very important the blood of the donor be Rh negative. If positive blood were given, it would promote Rh antibodies in the recipient, thereby laying the foundation for untoward reactions in subsequent transfusions. If antibodies were already present in the recipient, the giving of positive blood would be a factor in producing an immediate reaction. (b) If the mother's blood is found to be Rh negative, it gives a definite indication for determining the Rh factor in the father's blood. (c) If the mother is Rh negative, and the father Rh positive, antibody determinations can be used as a basis of prognosis on the outcome of the case, as well as furnishing a guide to the management of the present case, and the probabilities in the outcome of future pregnancies.

(15) *Question.*—Is there any relationship between the Rh factor and mental deficiencies?

Answer.—At the present time there is no positive evidence that would involve the Rh factor as a causative agent in the production of mentally defective infants, but several investigators have found at least presumptive evidence that there may be a connection. It has been proven that only one of 12 pregnancies which could theoretically result in an erythroblastotic infant does so. This may be due to the fact that some Rh negative mothers are incapable of producing antibodies, or the placenta may be impermeable to fetal blood in some cases. It is conceivable that iso-immunization in the mother may result in effects, other than those of classical erythroblastosis. Yannet, Herman and Bull,[5] report on 109 cases of mental defectives; of these 53 were specific types of mental deficiencies in which the cause was known. Among these 53, the distribution of the Rh factor was normal. In the remaining 56 cases of undifferentiated mental defectives for which no cause was known, there were twice the expected number of Rh positive babies, and Rh negative mothers. Snyder, Schonfeld, and Offerman,[6] reporting on 66 mothers, and 68 feeble-minded children found the same thing, that is, twice the expected per cent of Rh positive babies, and Rh negative mothers. These findings although far from conclusive evidence, would at least bear further investigation.

(16) *Question.*—Should every pregnant woman and her husband have Rh determinations?

Answer.—It is certainly very desirable to have every pregnant woman's Rh factor determined, if it has not been previously done. In every case where a mother is found to be Rh negative the father should be tested. Where the mother is Rh positive, it is not necessary to test the father.

If the Rh determination of every pregnant woman presents too great a difficulty, due to lack of facilities, or remote localities, at least the test should be made, if at all possible, on every primipara and on every multipara where the history would suggest an Rh negative finding.

At the present time, there are laboratories

well equipped to make these Rh factor determinations. There are, however, very few centers, or laboratories, which can report on the Rh antibody titer.

Another difficulty in making these studies as a routine procedure is the matter of expense, especially in the very low income groups. One very practical means of this work would be the sponsoring of facilities for doing these determinations by such agencies as state boards of health, charity, and semi-charity hospitals, and clinics, and civic welfare organizations.

It is our personal belief that the subject is of sufficient importance to justify a concerted effort on the part of the medical profession to make widely available facilities for these determinations for pregnant women.

We wish to acknowledge gratefully the aid of Dr. Marion Beard in the preparation of this paper.

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806 Heyburn Building

DISCUSSION (*Abstract*)

Dr. Marion F. Beard, Louisville, Ky.—One of the things that I have found most useful in explaining the Rh factor to patients is to emphasize the fact that Rh negative means an absence of Rh. Most lay persons can understand the whole process much better if they understand that an Rh negative is not a different kind of blood but simply an absence of Rh positive.

Another factor which they are most interested in is the question of what can we do about an individual who is immunized against the Rh factor. We must admit at present to the laity that we can do nothing. There have been recently, however, some rather ingenious studies which I think should be briefly mentioned. One idea has been to block the reticuloendothelial system with typhoid vaccine, thus attempting to prevent the production of anti-Rh. I think that is a pretty far-fetched idea, but it is rather ingenious. I have not had any personal experience with it and I am afraid I am not going to. I just cannot see the advantage of filling a pregnant woman full of typhoid vaccine in an attempt to keep her from developing Rh antibodies, but that is a step in the direction in which we will have to work in attempting to prevent erythroblastosis in the child.

The other question, I think, that should be emphasized is the importance of the antibody determination as a prognostic feature in these patients.

Antibody determinations have been useful. They are somewhat difficult, and most laboratories are not yet equipped to do them. As the demand increases, the laboratories will be equipped to do them. These antibody determinations are of great help in predicting whether the child will be erythroblastotic, and the severity of the process in the child. These are the two factors that most Rh negative mothers want to know: whether they are going to have a child with erythroblastosis; and, if they are going to have one, how much chance will there be of saving the child.

Dr. Richard Paddock, St. Louis, Mo.—A significant fact recently brought out is that one might expect trouble only once in three hundred cases, approximately, which need cause no general alarm.

I have not yet been able to run routine Rh factor determinations, but for the last three and a half or four years I have run Rh factor determinations in all cases of sterility, in all cases of toxemia of pregnancy of severe enough symptoms to require special treatment, in all cases of abortions, and in all cases of stillbirths.

One of the most interesting things that we have yet run across is that in several cases in which we felt that the Rh factor was perhaps the causative agent in the abnormality with which we were dealing, later observations failed to obtain a proper check. In other words, we got an Rh negative determination the first time and then at some later date we ran the blood again just to get a check, and found that the Rh factor determination did not coincide.

I have three cases in mind in which I felt originally that the Rh negative factor was the causative agent; and yet in two subsequent studies I failed to get an Rh negative result. In other words, the results came back, with Rh positive determinations done in other laboratories.

That brings up an interesting fact which I would like to point out and that is, in spite of the fact that we have trouble with Rh negativity, and a definite condition which we know as erythroblastosis, our incidence of error at the present time is greater than the expected incidence of trouble from the negative Rh factor.

Dr. Henry J. Langston, Danville, Va.—Since these discussions about the Rh factor have been printed, patients who have employed me to give them prenatal care and deliver them, have almost overwhelmed me with articles to read and they ask me all sorts of questions which I have not been able to answer.

In my laboratory I have found many instances of slight discrepancies of blood matching which have frightened me at times in transfusions. There was a case of a transfusion from one brother to another.

The blood checked apparently perfectly the first time, and the second time the man almost died immediately after transfusion.

To a woman who had had a miscarriage and had bled almost to death, I gave the husband's blood, which seemed to be all right, and for three days it appeared that she might die.

The Rh factor has caused me to wonder if we have yet reached the last word in the matching of blood. Apparently if we have a patient who has an Rh negative and is going to have a baby, we cannot offer her very much hope even if we do a cesarean section at the eighth month. So it seems to me that we who are doing obstetrics must develop our laboratories to the point where we will have very expert technicians.

If we have to resort to many laboratories, with many technicians, we may find discrepancies.

ROLE OF STELLATE GANGLION BLOCK IN CERTAIN NEUROLOGIC DISORDERS*

By WILFORD A. RISTEEN, M.D.

and

PERRY P. VOLPITTO, M.D.

Augusta, Georgia

The results of injections of the stellate ganglion have been the subject of numerous publications over the years. The number of patients so treated has been small. Interest in this procedure has been responsible for a large series of injections. The purpose of this paper is to give a running account of experiences and observations made and, to some extent, expand theoretical considerations.

The stellate ganglion usually is situated[1] between the transverse process of the seventh cervical vertebra and the neck of the first rib. It is formed by a fusion of the inferior cervical ganglion and the first thoracic ganglion. The outflow from this ganglion has a very wide distribution. On clinical grounds it must be concluded that the fibers reach the brain and the upper extremity, the thoracic viscera and the abdominal viscera as far as the transverse colon.

With such a range of activity the clinical importance of this structure is quite apparent. These studies have been, to a large extent, confined to conditions within the cranial cavity.

The physiology of the cerebral arterial circulation may be outlined briefly. That there is an innervation of the cerebral vessels similar, if not identical, to that of arterial systems in other regions and organs has been shown to be correct.[2,3,4,5] A sympathetic and parasympathetic reactivity is present. The sympathetic supply may be traced from the cord via the upper thoracic and cerebral ganglia to the carotid vessels and following its branches to present a complete coverage of the entire hemispheral vascular tree. This is aided by the vertebral arteries and their accompanying sympathetic fibers. The parasympathetic fibers have been traced from the bulb via the seventh pair of cerebral nerves to the geniculate ganglion and then beyond through the great superficial petrosal nerve to anastomose with the carotid nerve. From this connection the vasoconstrictor and vasodilator fibers are in direct anatomical relationship as they follow the divisions of the vessels.[6]

It has been well established that procaine block of sympathetic ganglia of other regions allows for control by the vasodilator fibers.[7,8] It was thought that an interruption of the sympathetic supply to cerebral vessels by injection of the stellate ganglion with procaine would allow for greater caliber of the cerebral vessels at all levels of the ipsolateral side and for an improvement of blood circulation to injured parts. Such a procedure has been completed 3,000 times to a group of 275 patients.

Interruption of sympathetic impulses by blocking the stellate ganglion with one of the local anesthetic agents may be accomplished by several methods or approaches to the ganglion. The results on the original group of cases reported were obtained by use of the posterior approach.[9] Later the anterior approach, as advocated by Ochsner and Debakey,[8] was used. The present method is a definite anterolateral approach devised so as to utilize bony landmarks.[10]

The patient is kept in the recumbent supine position. The head is turned to the side opposite the injection. The arm on the side to be blocked is placed at the side of the patient and the

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*From the Departments of Neurological Surgery and Anesthesiology, University of Georgia School of Medicine.

shoulder depressed caudad. The seventh cervical transverse process is located anteriorly by palpating the sixth cervical transverse process, which is usually the most prominent, and measuring down 2 cm. from that point. A skin wheal is raised 1 cm. above the mid-point of the clavicle. An 8 cm. needle is advanced at a 45° angle with the sagittal plane of the body downward and medially towards the seventh cervical transverse process. Either the lateral end of the neck of the first rib or the tip of the seventh transverse process is encountered at a depth of 5 or 6 cm. When bony contact is made, the needle is withdrawn slightly and reinserted downward and inward to assure the presence of the needle on the first rib. When the location of the first rib is assured, the needle is placed again at the outer end of the neck of the first rib or the tip of the transverse process of the first dorsal vertebra. When this bony contact is made, the position of the hub of the needle is changed to an 80° or 90° angle with the sagittal plane of the body and advanced 1 to 2 cm. until it impinges on bone. This may be the medial part of the first dorsal transverse process, the neck of the first rib, or the body of the first dorsal vertebra. Any of these points are within the fascial plane of the stellate ganglion. Five cubic centimeters of 1 per cent procaine solution is slowly injected at this point. Care is first taken that neither blood nor spinal fluid is aspirated into the syringe. The objective signs of interruption of sympathetic impulses will appear in one or two minutes.

A word or two concerning the objective signs of interruption of the sympathetic impulses is in order. The classical Horner's syndrome of miosis, ptosis of the lid, anhydrosis and increased temperature of the upper extremity, chest wall and face of the injected side is well known. Increase in conjunctival vascularity has not been given any prominence as an objective sign. Fulton[11] mentions it briefly. This has been found to be a most useful sign. Another sign that appears early, constituting in itself ample evidence that the ganglion has been procainized, is an increase of intraocular pressure. This also has been recognized by Fulton.[11] This change occurs only for some seconds. The pressure then diminishes by about one-half in each instance. This has been measured after blocking in a group of 15 patients. The interval between blocks varied from 24 hours to 10 days. After each block the pressure was reduced and with these 15 patients did not return to normal for 3 weeks after blocks were stopped. Patients with glaucoma of the simple, uncomplicated type will show a marked reduction in pressure. The effect is not maintained long enough to be of practical clinical importance in therapy of this condition.

The vascular disorders of the brain may be divided into (1) hemorrhage, (2) thrombosis, (3) embolus and (4) spasm. The following diagnostic criteria have been used. This may be extended as the person's experience warrants. In the main, the more common points are included. If one observes the sequence of events more than the isolated objective findings, the differential diagnosis is usually established.

The plan of treatment used in each of these divisions is as follows:

When extravasation of blood into cerebral tissue is suspected, block therapy is delayed for a matter of 3 to 5 days. Fresh hemorrhages have been blocked without any apparent change in condition. On theoretical grounds it is better to wait 3 to 5 days.

(1) In the acute phase increase in bleeding is possible.

(2) The associated regional changes in vessels do not occur.

(3) Later, swelling will be reduced by increasing the regional blood supply.

(4) There is better opportunity for increase in collateral circulation.

Fifty-six old hemorrhage cases have been blocked. The time interval from insult to block varied from one week to 6 years. In each instance some improvement has been noted. The

	Hemorrhage	Embolus	Thrombosis
Warning	Usually short	None	May be over long periods
Shock (nervous)	Moderate	Marked	Usually slight
Loss of consciousness	Usual	Usual	Only in large occlusions
Convulsions	Rare	Rare	Fairly common
Objective findings	Develop rapidly	Develop rapidly	Develop slowly

Table 1

functional return in the legs will always be more prompt than that in the arms. This group presented the usual signs of the old hemiplegic. In some the increased tone and the spasticity were such as to give quite severe discomfort. After block there is a relaxation of varying degree. These people are more comfortable. If some degree of motor function is obtained with the relaxation, their outlook on life is very much brighter.

Patients in whom arterial spasm occurs respond most promptly to stellate ganglion block. In the more recent works on neurophysiology one reads that no sympathetic activity is present in the region of the medulla. Two patients with posterior inferior cerebellar arterial spasms have had an immediate cessation of symptoms after blocking. People seem to have forgotten the vertebral artery as a carrier of sympathetic fibers. Spasm of cerebral vessels reacts just as promptly and the cessation of symptoms is immediate. Eight such patients have been blocked.

Embolic phenomena in the brain are much less frequent than hospital records would lead us to believe. When emboli do occur, it is best to wait 24 hours before blocking. It is reasonable to expect that with relaxation of vessels the embolus might move and become lodged in a portion of the arterial tree where no hope of aid through collateral circulation would be possible. It is better that it become a mural thrombus and then to allow relaxation with the hope that a trickle of blood will go beyond the thrombus site. In patients with an old embolus, the only results have been in lessening of the spasticity. No motor return has been seen in this group.

Any procedure directed toward relief of a disordered physiologic state brought about by cerebral thrombosis can have but one purpose and that is to restore the blood supply to a specific area of the brain. In recording the steps in treatment as outlined in accepted works, one must of necessity be struck with the idea that these steps promote rather than counteract the tendency for stasis in the regional blood supply. Increase in supply by vasodilating drugs has not been sufficient to give the desired result. Regional sympathetic block will dilate the entire supply of the blocked side. This, one may readily prove by direct observation of the cortex through burr openings. The increase in vessel size is immediate. It is not confined to the brain but includes the scalp and dura mater. We have felt that blocking may be done at any time in the thrombus group. In the patient with advancing signs, response has been immediate and, in many instances complete. We have had no evidence that the thrombus dislodges. In the group with older lesions the response may be less abrupt and may require repeated blocks for full effect. Once an improvement is noted, this improvement will be maintained. We do not wish to be misleading and intimate that all of these people have a full return to normal motor activity. Improvement has varied from 30 to 90 per cent in this group. Argument arises that some recovery takes place without treatment. This is true. On the other hand, experience refutes the idea that unless there is some recovery within 30 or 40 days, the condition is permanent and that no help is to be expected should contractures occur. The majority of the people in the latter group have shown recovery sufficient to be up and about without walking aids.

Observations concerning reduction in spasticity with vascular accident led to the blocking of individuals in the post-encephalitic Parkinson group. Here the results have been most interesting. Again one may theorize at length. The extrapyramidal rigidity diminishes, the tremor increases until repeated blocks have been carried out, propulsion or retropulsion lessens. Wartenburg[12] is very probably correct in his concepts of fatigue Parkinsonism. It has been noted that original changes are more apt to persist if the patient does not use his new abilities to the tiring point. On the other hand, if these people will use graded exercises, the prospects of rather marked improvement after repeated blocks is quite good. The time interval between blocks varies. Patients soon learn the limits of waiting and set their own schedule according to their symptoms. It is also interesting to note that the usual drugs used in this condition will have a better effect on the blocked patient. This is true especially with the use of benzedrine and atropine. The known tolerance of these patients seems to be decreased and the drug dosage may be markedly reduced.

Experiences with this series of stellate ganglion blocks have been similar to those described by others in causalgic states and other vaso-

spastic conditions. The use of this procedure in visceral conditions, both thoracic and abdominal, is most interesting; but due to the small number of patients in each group, no definite conclusions may be drawn at this time.

A few words of warning are in order. This procedure is not without some danger. Pneumothorax is always a possibility although the incidence in this series has been only 3 in 3,000 with the anterolateral approach. Hematomata are more frequent but never of any serious consequence. If one blocks an asthmatic or emphyzematous patient, adequate preparation for tracheobronchial aspirations should be made. If during the course of a block, the patient complains of cardiac pain, inject the procaine at once. This is an indication of stimulation of the ganglion and coronary spasm. Fatalities have been heard of during this procedure. These were probably due to coronary difficulties and the procaine was not injected but the needle withdrawn with the first symptoms of cardiac difficulty. It is felt that the injection of the procaine will obviate this. In this series this experience has been encountered on four occasions. There have been no deaths from this or any other cause in this series of 3,000 stellate ganglion blocks.

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DISCUSSION (*Abstract*)

Dr. V. P. Sydenstricker, Augusta, Ga.—It has been my privilege to see many of the patients to whom Dr. Risteen has referred and, as a matter of fact, many of them have been from the medical service because cerebral thromboses usually find their way into the wards of the medical division.

The results in early thrombosis or perhaps in what might better be called intramural hemorrhage, if one follows Winternitz' ideas regarding the usual development of cerebral thrombosis, may be quite dramatic, especially in patients whose troubles have been of only a few hours duration.

The customary thing when stellate block is done is for the person to look very surprised, lift the paralyzed arm and either scratch his head or take hold of the head of the bed, and in cases where there is dysarthria or other speech difficulty, the patient frequently starts to talk. This happens too quickly for it to be anything but the effect of rapid dilation of the vessels and increase in blood supply and perhaps of general relaxation of spasm on the affected side.

The removal of edema, we suspect, is also a rather important factor in the rapid improvement which many patients have shown.

It has been most interesting, too, to see the improvement in patients whose vascular accidents have occurred many months or even several years before and, as Dr. Risteen has emphasized, the reduction in spasticity and the frequent return of motor function in the leg is of great importance in the lives of these people. They are able to be ambulatory where before they might have been confined to a chair or able only to walk with a crutch.

In Parkinson's disease, we all know that psychotherapy is a most important thing and any treatment which is offered with considerable enthusiasm may cause temporary improvement.

I think we have proven that stellate block is not just psychotherapy in a number of aged, very ignorant Negro patients with Parkinsonism who have been restored to motility, if not usefulness. At least they are no longer bed patients who have to be waited upon, but they are able to get about and do for themselves.

The tremendous improvement in spasticity is striking. Tremor is not nearly so much improved. Occasionally one sees a tremor get somewhat worse, but the patients are able to walk. They lose their retropulsion and propulsion and are quite different individuals.

Another interesting phenomenon which Dr. Risteen did not mention, probably because our series of cases is still quite small, is the apparent improvement in certain peptic ulcers following the stellate block. There again we think it is purely a circulatory response but a quite rapid healing from the x-ray standpoint may

ensue so that in as short a time as five to seven days the x-ray evidence of peptic ulcer has disappeared and patients' symptoms have entirely cleared.

These things happen occasionally with ordinary management of peptic ulcer, but we feel that the apparent regularity with which it has occurred in a small group may be of some significance and perhaps an effect analogous to sections of the vagus.

Dr. R. Eustace Semmes, Memphis, Tenn.—I think Dr. Risteen deserves a good deal of credit for working up this large series of blocks of the stellate ganglion.

Our feeling has been in general that in order to do much good the block had to be done pretty quickly, because softening occurs soon after the blood supply is cut off from any part of the brain. Apparently they have been able to get some of these patients early.

The other thing which has troubled me is that the procaine block is short in duration. I am wondering whether they have considered the use of some of the new preparations such as "bromsalizol" which last a considerable length of time. They have been used elsewhere in Raynaud's disease, and causalgia, with prolonged benefit.

It seems to me that if it is possible to prove conclusively that there is benefit resulting from stellate block, it might be worth while to consider using surgery which would have a lasting effect. I do not know whether Dr. Risteen has done any so far for these particular vascular diseases.

However, we ought to be a little bit cautious in drawing conclusions even from this large series, because it is well-known that improvement follows vascular accidents in the brain. It is sometimes surprising. I think I can say pretty surely that I have seen immediate improvement follow injection of the stellate ganglion in early cases, just as he has reported.

Dr. Risteen (closing).—In answer to Dr. Semmes' question concerning the use of other materials for the purpose of effecting longer blocks we have felt that long blocks are not necessary in that the balancing mechanism of the autonomic system may be interrupted completely with procain and that a prolonged disruption is not necessary. We have found that procaine is as useful as the longer reacting drugs such as "nupercaine" in oil. Alcohol is somewhat dangerous due to the painful side effects.

It has been our experience that, with procaine, we are able to achieve a maximum response and that once a response has been achieved using procaine, this response will be maintained. We have not felt that the longer reacting drugs were worthwhile.

It is also our impression that repeated blocks will bring about the same end result with greater safety. We also feel that much surgical intervention may be avoided by the use of repeated blocks. Certainly in the vascular accident group procaine block is the safest procedure.

A RESUME OF THE MANAGEMENT OF CANCER OF THE RECTUM AND COLON*

By HERBERT T. HAYES, M.D.

and

HARRY B. BURR, M.D.†

Houston, Texas

During the past few years, we have developed several improved methods of handling cancer of the lower bowel. We are getting more of these cases early and we are operating upon more cases which we formerly thought inoperable. More patients are being examined when any untoward symptoms arise, and again, more people are having routine examinations. It is surprising the number of polyps, which are potential malignancies, that are found during routine rectal examinations. We have found 185 rectal polyps and 14 polyps of the colon during the past 7½ years and most of these were asymptomatic and discovered only by routine proctoscopic examination.

We have been doing colon and rectal surgery long enough definitely to appreciate the improvement that has been made during the past 15 years. Fifteen years ago we doubt that there were many surgeons who gave much thought to the thorough preoperative preparation of the patient for surgery of rectal or colon malignancies. The patient was sent into the hospital one day and usually operated upon the next. The mortality was higher then than at present. There has been a gradual improvement in handling these cases, and we think we have increased the operability, lowered the mortality and increased the number of 5-year cures. The 5-year cures are probably about 50 per cent.

We are now doing more multiple stage operations upon the colon and more one-stage operations upon the rectum. We feel very strongly that the one-stage procedure for cancer of the rectum is the operation of choice in the majority of cases. We feel that multiple stage operations upon the colon are the most satisfactory for the average surgeon. But we have made some

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†Commander, Medical Corps, U. S. Naval Reserve.

changes in our preoperative preparation that make a one-stage procedure preferable in many cases.

We will briefly outline our preoperative care which we have found to be quite satisfactory.

We send these cases into the hospital for preparation 5 to 7 days before operation and at times keep them even 10 to 14 days. About half of them, probably more, are in various stages of intestinal obstruction and urgently need decompression before an operation. We think that in the past, lack of proper decompression was one of the chief factors in the high mortality following a one-stage procedure on either rectum or colon. Urologists learned the value of decompression of the bladder for prostatic surgery long before we learned the value of decompression for colon and rectal surgery.

In partially obstructed cases we give a phosphate preparation at two-hour intervals for a period and then each day at 6:00 a.m. Colon irrigations are given twice daily, using large quantities of water and being careful not to injure the patient with the tube.

Where there is no obstruction we give enemas twice a day and a small dose of milk of magnesia at night.

Complete blood counts and urinalyses are done. Many of the advanced cases are anemic and those who have under 80 per cent hemoglobin are transfused repeatedly until the hemoglobin is normal. Vitamins B and C are given by hypodermic each day.

A high caloric, low residue diet is given until 24 hours before operation when only liquids are allowed. Phenobarbital 0.5 grain three times a day helps keep the patient quiet and a few days rest in the hospital relieves the apprehension and fear. We feel that the partial bed rest helps to get the cardiovascular system adjusted and possibly explains why we have few cardiovascular accidents in elderly patients.

In all cases of colon cancer and in any case of the rectal cancer that we think might become contaminated at operation we give "sulfasuxidine" 30 grains every 4 hours for 5 days before operation. Sulfathiazole is used routinely in the abdomen when closing. There is probably a place for penicillin in the care of these cases and we are following the suggestion of Cryle, and in contaminated cases, using large amounts of penicillin, 100,000 units every 2 hours for 2 days, then 50,000 units every 2 hours for 2 days, then 50,000 units every 4 hours for 3 days. We are also using it before operation where the patient has fever or we think there is infection around the growth. In all second-stage closures of colostomies we give "sulfasuxidine" and also irrigate the lower segment twice per day with sulfasuxidine emulsion.

Immediate preoperative care consists of pentobarbital, grains 3, two hours before operation and a hyocine morphine combination one-half hour before operation. The patient is operated upon under spinal anesthesia unless there is some definite contraindication. Procaine 50 mg. and "pontocaine" 20 mg., supplemented with intravenous "pentothal" sodium if the operation is prolonged.

An infusion of glucose is started immediately and one quart of blood is given during the operation. We think the patients have done better since we have been giving 2 pints of blood instead of one. We have used very little plasma, probably because of the cost. If the operation is prolonged, 1 qt. of 5 per cent glucose is given in addition to the blood and the patient is kept unconscious all the time by injecting very small amounts of "pentothal" sodium into the infusion tubing. If the spinal anesthetic plays out the operation is completed with the "pentothal" sodium anesthesia. We have found such uses of "pentothal" sodium to be invaluable. We have used it in this manner for seven years and have never had a fatality. We have always had excellent anesthetists, however.

Complete obstructions in the colon or rectum are usually slow obstructions. If we are not able to decompress these cases in the ordinary way we usually do a cecostomy, sometimes a colostomy, but if they are very distended a cecostomy is the simplest and safest thing to do through a gridiron incision large enough to admit the hand. We think that we are justified in inserting the hand and exploring to a certain extent. One will then know more of the local pathology and can decide upon future procedures. At times a second operation is not necessary or advisable.

We have not time to discuss all of the opera-

tions used but we will briefly mention some of these procedures.

For the early scirrhous growth of the anus we prefer to do either a posterior resection of the rectum or an abdomino-perineal resection. It is in these cases that we think we get the poorest results. Such anal growths are the only malignancies of the lower bowel in which we feel justified in using radium or x-ray. We think some of these do just as well with this form of treatment as they do with surgery. The results from either are poor.

In most cases of rectal and recto-sigmoid cancers we do an abdomino-perineal resection. This operation, perfected by Miles, represents the most radical procedure that can be done. We leave the patient with a single-barrel colostomy in the midline. We may be somewhat biased, but we much prefer the abdominal to the perineal colostomy. We think the patient is much more comfortable with an abdominal colostomy and is more satisfied. We have had no experience with construction of a perineal anus following an abdomino-perineal resection as recommended by Bacon and also by Murdock.

The anterior resection of the upper part of the rectum or recto-sigmoid with primary anastomosis is used extensively by Dixon of the Mayo Clinic, and is recommended for growths that are 10 to 15 cm. from the anus. This operation is usually suitable for the upper rectum and lower pelvic colon extending up to the entrance of the superior hemorrhoidal artery. It is not an easy operation to do but most patients do not want a permanent colostomy and this operation should be given due consideration in suitable cases. We do not think it is so radical a procedure as the abdomino-perineal operation though some of its advocates claim that it is. We have done only two cases.

For growths in the pelvic colon and sigmoid we do an exteriorization as recommended by Mikulitz and later modified by Rankin. These patients have only a temporary colostomy. An air vent is made in the proximal loop the next day after the operation. The spur is clamped anywhere from the fourth to the seventh day after the operation and the patient allowed to go home for one month or more. The colostomy is then closed. In these cases you should dissect out the blood supply and turn the bowel properly before applying the Rankin clamp, so you are sure not to injure the blood supply when the Rankin clamp or the spur clamp is applied. You can have hemorrhages that will be very severe. We have had two that were extremely bad, but both patients lived.

In some of these cases involving the sigmoid we do an end-to-end anastomosis and we think it is much safer now since we have "sulfasuxidine." In the splenic flexure cancers we usually do an obstructive resection. They are nearly always hard to do. In malignancies of transverse colon we do an obstructive resection or end-to-end anastomosis. In cancer of the ascending colon we usually do an obstructive resection, bringing out the ileum and colon as a double-barrel, and clamping the spur and closing later in the usual way.

After opening the abdomen on many of these cases we are confronted by the fact that the patient has liver metastasis of a varying degree or extention into other organs. In these cases we think the surgeon should remove the primary growth if possible, not to demonstrate his technical skill in doing a difficult piece of surgery, but because he will make these patients more comfortable, especially if the growth is a rectal cancer. They will also probably live longer. If found inoperable a loop colostomy is usually done.

After surgery the patient is given 1,000 c. c. of 5 per cent glucose three times a day and nothing by mouth. Two hundred mg. vitamin C are given every day. A Foley retention catheter is kept in place usually for one week. Liquids are allowed by mouth usually within 48 hours. Transfusion is of course, repeated in any of the poor-risk cases. The clamp is removed from the colostomy within 24 hours. We do not start Wangensteen suction as a routine and we rarely have to use it, but if there is distention and vomiting we immediately start suction. If the patient is well prepared, allowed nothing in his stomach for 48 hours to 72 hours, and given plenty of blood and other fluids by vein, there is usually no distention when an abdomino-perineal resection has been done. A glycerine enema is given on the fifth day postoperatively. Frequently the bladder or vagina adheres to the

floor of an abdomino-perineal wound and causes a large pocket for the accumulation of infection in the upper portion. Hence it is wise to break these adhesions down every few days with the finger. We have rather rigidly adhered to this routine management with some variations for a number of years and we think we have been amply repaid for our trouble. We feel that our complications are fewer and our mortality rate is lower than formerly. We have an excellent anesthetist who carries out the routine in the operating room and for this we are most grateful.

DISCUSSION (*Abstract*)

Dr. C. Ross Deeds, Cincinnati, Ohio.—As a background for my discussion, may I read to you a short report of Dr. Germain, chief pathologist at one of our largest hospitals, and part-time pathologist at four other metropolitan hospitals:

"The pathologist, thanks to increasing alertness of the medical profession and information given the layman, is seeing an increasingly greater number of biopsies of rectal lesions and an increasing percentage of these lesions are early lesions.

"Of the biopsies, about 60 per cent are Grade I small carcinomata; about 30 per cent are Grades II to III large carcinomata; about 10 per cent are simple, benign polyps.

"Of the clinical polyps, about 75 per cent show sufficient dedifferentiation to be classified as Grade I carcinoma.

"Of the excised lower intestines, about 75 per cent of the carcinomata have already extended through the muscularis and are beginning to infiltrate the peri-intestinal fat.

"In spite of this, in only about 20 per cent of these can peri-intestinal glands be demonstrated. The glands uniformly show reaction to infection and the prognosis, in spite of extension of neoplasm through the wall, is not necessarily bad. I have no figures to estimate percentages of cures with radical surgery. What cases later come to autopsy show that the metastases to regional lymph nodes are well proximal to the segment of intestine involved by the primary lesion.

"About 10 per cent have liver metastases at the time radical surgery is done.

"Of the carcinomata, about 20 per cent show some approach to the colloid type.

"A small percentage have been operated upon for hemorrhoids by general surgeons who have failed to examine the rectum, although the malignant lesion was within reach of the finger."

I am sure you will agree that this report of Dr. Germain's is inspiring. If we are going to lower our mortality rate and improve the charts, graphs, and figures that are reported at our meetings, surely it is obvious that the only method by which this can be accomplished is by making earlier diagnoses, and thereby bringing the patient to surgery with a better chance of recovery. An earlier diagnosis can be made only if more people with vague rectal or gastro-intestinal symptoms are subjected to proctoscopy or sigmoidoscopy more frequently or routinely.

Generally speaking, when a tumor mass within the rectum can be felt by digital examination, it is already too late. A barium enema x-ray gives little information of conditions in the rectum or lower sigmoid unless they are quite large and obstructing. In such a case, it is again too late. The proctoscope, intelligently used, will discover these lesions months, even years before they are discernible by the above-mentioned methods of examination. Many more physicians should become acquainted with the use of the proctoscope.

Using the year 1944 as an example of what routine proctoscopic examination discloses, I should like to report that twenty-two unsuspected polyps were discovered. All were biopsied. Of these, eighteen were reported by Dr. Germain to show sufficient dedifferentiation to be classed as Grade I carcinoma. All were removed without a major procedure. Judging entirely by past experience and the opinion of many men, these eighteen patients have been spared much more serious trouble.

Of course, we know that all polyps do not become malignant; however, many can, so that any particular one must be considered pre-malignant. Judging by the above experience, is it not reasonable to assume that if more routine and thorough examinations were made, many, many more cases would be brought to operation at a more favorable time and in a more favorable condition? As I see it, it is only by earlier diagnosis of carcinoma of the rectum that we can improve our mortality rate. May I quote from Dr. Ewing who has said:

"It is the general opinion of experienced physicians that emphasis upon a systematic and competent examination of the rectum and sigmoid for suspected cancer is capable of yielding a greater reduction in the mortality of cancer than anything else."

Dr. Louis J. Hirschman, Detroit, Mich.—The importance of liver metastasis in its relation to operability has been mentioned. Like other proctologists I have had the experience upon opening the abdomen and examining the liver of finding that metastasis has progressed to a considerable extent. Naturally, I have given the family and friends a very grave prognosis in such an instance and have informed them that the patient could live but a very few months. A palliative operation has usually been performed for symptomatic relief and comfort, particularly in the presence of obstruction. Recently I was confronted by one of these patients two and one-half years after a palliative colostomy and thorough cauterization of an irremovable tumor was performed. We used the cautery in these cases in order to lessen the hemorrhage and discharge and to ease the patient's worries and put him in a more

tranquil frame of mind. This gentleman, who was a clergyman and who under ordinary circumstances should have met his Maker two years ago, is still preaching the gospel, although now slowly losing ground. Even though we do not expect to cure our patients in cases such as these, we are surprised at the unusual amount of resistance and increase of longevity of patients after these palliative measures in what appeared to be hopeless cases.

The question of operability, I believe, depends upon the ability of the operating surgeon. There are some cases some proctologists consider definitely inoperable, while others seem to be able to eradicate the growth and give a great deal of comfort, if not a cure.

I do feel that one should not be influenced too much by a single biopsy report. One should have multiple biopsies from different areas of the tumor in order to get a thorough opinion as to degree and type of malignancy. Personally, I do not believe we are justified in performing a colostomy merely to prolong life in a patient who has an inoperable growth. The colostomy should be performed only to relieve obstruction and lessen suffering. If I had such an inoperable growth with no obstruction, I would not wish my own life prolonged just for the sake of "living a little longer."

I believe that the fact that a large percentage of patients between the ages of twenty and fifty are afflicted with carcinoma of the colon needs to be stressed whenever we are called upon to speak before gatherings of medical men. We must repeat and repeat that there is no such thing as a "cancer age." In our own practice, we have had patients suffering from carcinoma of the rectum as young as sixteen years of age and as old as ninety-six. Almost fifty per cent of our cases are below fifty-five years of age. We must stress the importance of including in every physical examination of patients suffering from any deviation from normal physiologic function, a complete proctoscopic-sigmoidoscopic examination; and always a gastro-intestinal series.

When the barium enema is given, the operating surgeon should try to be present with the roentgenologist in order to manipulate the colon under the fluoroscope. This gives him valuable information as to the mobility of the colon and the location of the tumor in relation to other organs, which is extremely important to him when planning the operative attack.

I must plead guilty to performing some perineal colostomies. Not infrequently we perform abdomino-perineal excision and, instead of implanting the sigmoidal stump in the abdomen, we carry it down to the perineum and not infrequently save the sphincter and give the patient a surprising amount of fecal control. Where we have a low-lying growth with involvement of the sphincter, we do the Lynch type of perineal excision. The criticism of some that a patient is unable to control leakage from a perineal colostomy is not entirely justified. It is not so much whether it is an abdominal or a perineal colostomy that is important. It is the kind of care the colostomy receives which really counts. If the colostomy is regularly completely irrigated and the patient put on the type of diet that keeps him in the constipated state, he will have no difficulty. We believe we have saved quite a number of lives by performing a perineal colostomy for patients who absolutely refused the abdominal type. In about thirteen per cent of these patients, lives have been saved by utilizing this procedure.

It is very useful in discussing colostomy with carcinomatous patients to have them meet patients who already possess colostomies. They are really the best salesmen I know.

When under x-ray examination one finds a large sigmoidal loop which is freely movable on account of being attached by a large mesentery, one can usually bring the sigmoidal stump down to the anal site and anastomose it to the anus. By this I mean bringing the stump down to the outside so that it protrudes from the anus for a couple of inches. It is then attached to the upper margin of the anal canal just where the transiderm merges into the mucosa. After good healing has occurred, the protruded portion of the sigmoid is removed and a continent anus remains.

Sometimes after I have performed a Miles' type abdomino-perineal resection and have opened the removed specimen and have seen a perfectly normal sphincter lying about five inches below the growth, I have blamed myself for not attempting to save sphincter function. I believe the pendulum is swinging back to sphincter salvation.

I believe that as far as the recurrence rate is concerned, you will not find any more recurrences in the perineal region that you would in the abdominal stoma. Recurrences do not occur in a downward direction nearly so much as upward.

Dr. Hayes has given an excellent resume of the preoperative care of patients for carcinoma surgery. His methods are good, standard practice. I would differ with him in one point, and that in the use of saline purgatives for many days before the operation. We have found that after a day or two of purging we can keep the colon well cleaned out with soda enemas. We administer a high caloric, low residue diet, blood transfusions, glucose intravenously, and amino acids where the proteins are low. It would seem to me that by administering saline purgatives we are depleting our patient of a large amount of the fluids that we are administering. This tends toward dehydration.

In a case of sudden colonic obstruction, which appears out of a clear sky, this will be often due to a ring carcinoma of the sigmoid. In such cases we hesitate very much to do anything more than decompress through a right-sided colotomy, and then later, when the patient is in better condition, inject barium mixture and determine the location of the growth under the fluoroscope. We do not manipulate through the operative wound because we have seen, in some cases, the cecum distended like a toy balloon and its wall so thin that we have felt to manipulate manually might cause rupture.

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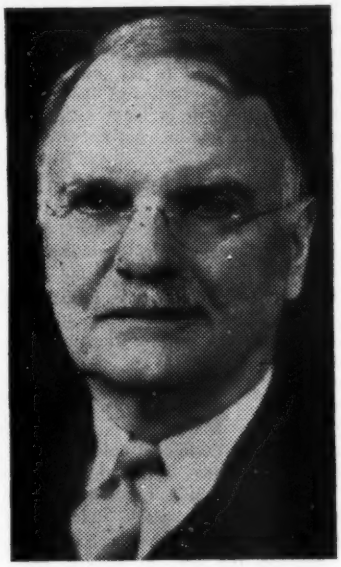
EDITORIAL DEPARTMENT

JOHN SHELTON HORSLEY

IN MEMORIAM



DR. JOHN SHELTON HORSLEY

It has been twenty years since this widely known surgeon, one of the noblemen of Virginia, was president of the Southern Medical Association (1926). At the time of his election he was in his early fifties. The president was a high ranking American both by birth and by achievement.

His family had been Virginians for two hundred years before him, being among the early settlers of the continent. His father and grandfather were planters in Nelson County. The father served under Stonewall Jackson in the Civil War, and later under General Mosby. Dr. Horsley was born in Nelson County in 1870, attended Virginia country schools and the University of Virginia. He completed his medical course at the University of Virginia Medical School in one year. Soon after graduation he published a report of a hip joint operation done upon a Negro in Nelson County which attracted the attention of John Wyeth in New York, and he became Wyeth's assistant. In 1903, at the age of thirty-three years, he was recalled to Richmond as professor of surgery in the Medical College of Virginia. He relinquished that position in 1912 when the Richmond schools were consolidated, and built St. Elizabeth's Hospital, which has since been made famous by him and his associates.

Throughout his practice he was active in cancer control work. He wrote several books including "Research and Medical Progress"; "Surgery of the Blood Vessels"; "Operative Surgery"; "Surgery of the Stomach and Duodenum"; and was associate editor of Lewis' "Practice of Surgery." He was the recipient of many honorary degrees.

An investigator from the beginning of his medical practice, he improved the fields in which he worked. No matter what the difficulties or how many administrative problems occupied his time, or how pressing were the exigencies of his clinical practice, he managed to carry on experimental studies. To quote the Richmond "Times Dispatch," he was one of those who "kept the torch burning in the darkness of poverty and in the adverse wind of circumstance."

The research medal of the Southern Medical Association was awarded him in 1916 for his

original contributions and studies in the domain of vascular surgery.

He is survived by his widow, the former Eliza Braxton, and six children.

Members of the Association count him as a friendly guiding spirit, and his life has furnished a brilliant example for younger surgeons.

ATOMIC ENERGY AND MEDICINE

The term "atomic energy" would have had little meaning in 1808 when John Dalton established the atomic theory and when atoms were considered to be the ultimate units of matter with a solid structure somewhat comparable to a billiard ball. In 1889, Sir William Crookes discovered that electric current was carried by material particles which were later named electrons. This discovery was made from observations of high voltage current passed through a vacuum tube (Crookes' tube) under magnetic and electrical forces. Thus the electron, a particle smaller than the supposed indivisible billiard ball atoms, was found to exist. In 1895 Roentgen announced the discovery of x-rays, a kind of invisible light that was able to penetrate solid objects. Just a few months later, Becquerel discovered the radioactivity of uranium, one of the heavy elements from which invisible rays were emitted, which fogged a photographic plate. The Curies continued this work with uranium and succeeded in isolating radium, which had even greater radioactive powers. By 1902 the atom could no longer be considered a solid structure. Particles smaller than atoms were coming from atoms, as evidenced in the Wilson cloud chamber in which subatomic particles could be traced by the fine line of white fog they produced in vapor saturated air. Lenard had showed that the atom was actually mostly empty space. Therefore, Rutherford was able to present the theory of complex atoms as spheres of electrical influence in which extremely small charged particles (electrons and protons) were held in equilibrium by their charges. In 1913, Bohr established the fact that atoms were like a solar system with the nucleus in the center surrounded by fixed orbits of electrons. In 1932, Chadwick discovered the neutron as another constituent of the atom. It was this neutron that enabled Fermi in 1939 to split uranium, resulting in the formation of two lighter atoms. Thus the possibility of the conversion of mass into energy as suggested by Einstein in 1905 became a probability. Hahn continued this work of Fermi and proved that a barium isotope was produced by the fission of uranium. Thus the atom was split and nuclear fission had occurred. These and many other important discoveries, such as Lawrence's American invention of the cyclotron, are what have made possible "atomic energy" as we recognize it today.

The developments of the last few years, directed toward the use and control of that energy from splitting atomic nuclei, have involved the field of medicine to a considerable extent. The work necessitated the use and production of tremendous amounts of radioactive materials which had been known to be dangerous for a long time. The physiologic effects of radium and x-ray are recognized as very far-reaching. Nearly all the pioneers in x-ray work died of cancer caused by x-ray burns. Until the proper precautions were recognized and taken, workers who painted the dilute solutions of radium on luminous dial clocks were found to develop aplastic anemia. However, instead of dealing with a few milligrams of radium as in hospitals and in ordinary physical measurements, science was faced with an amount of radioactive material which would be produced by fission of uranium, even in a relatively small chain-reacting system, which was equivalent to hundreds or thousands of grams of radium. In addition to the alpha, beta and gamma radiations from the radioactive material, there would also be an intense neutron radiation. Furthermore, uranium, the material with which the work was to be done, was known to be chemically poisonous in addition to the radiation dangers.

It is indeed a credit to the Health Division of the Atomic Bomb Project that none of the

personnel has shown permanent ill effects from their work in this hazardous field. The work of this health group outlined itself into three main programs:[1]

(1) Provision of instruments and clinical tests to detect any evidence of dangerous exposure of the personnel.

(2) Research on the effects of radiation on persons and instruments.

(3) Estimates of what shielding and safety measures must be incorporated in the design and plan of operation of the plant.

Pre-employment physical examinations and frequent re-examinations were adopted. In these, the white blood corpuscle count was used as a principal criterion, though it was recognized to be not entirely reliable. Tolerance standards for radiation doses were set up. Instruments for measuring exposure of personnel were under constant improvement and development. Pocket meters for indicating the exposure of individuals were used. These were electrostatically charged at the start of each day, and read at the end of the day. The degree to which they became discharged indicated the total amount of ionizing radiation to which they had been exposed. Another device was the film badge which consisted of small pieces of film worn in the identification badge. The films were periodically developed and examined for radiation blackening. Other instruments to test the efficiency of the shielding on permanent installations were varied. "Sneezy" measured the concentration of radioactive dust in the air. "Pluto" measured the alpha-emitting contamination (usually plutonium) of laboratory desks and equipment. Counters were used to check the contamination of laboratory coats before and after the coats were laundered. Other counters were concealed at the exit gates of certain laboratories so that an alarm sounded when someone passed whose clothing, skin, or hair was contaminated.

In addition to these and many other precautionary measures, an extensive program of animal experimentation was carried out on the effects of direct exposure to various types of radiations, and on the effects of ingestion and inhalation of the various radioactive or toxic materials such as plutonium, uranium and fission products.

It is true that medicine's role in atomic energy has been chiefly preventive so far. But the proper use of those properties and factors which required much care and precaution may lead to whole new fields of therapy. The most important one is perhaps the treatment of neoplasms, especially in the case of deep cancer. Furthermore, the fact that neutrons are apparently more destructive to white blood cells than they are to other tissues of the body suggests their possible use in leukemia. Also, the increased supply of radioactive isotopes makes their more extensive use in the treatment of disease a likelihood. Radioactive isotopes may also be used to trace the complicated sequences of chemical reactions which take place within the body.

These and other probable developments make it imperative that the physician be up to date in his knowledge and understanding of atomic energy. He must be not only aware of the possible deleterious effects, but he should follow its development, being always ready to find and use its practical applications to medicine. An excellent presentation of the development and use of atomic energy is to be found in the report by Henry D. Smyth, "Atomic Energy for Military Purposes." This report is not light reading, and some background of nuclear physics is valuable. However, there is much that is clear to the physician even on the first reading. Though this book deals chiefly with the military applications of atomic energy, the same basic principles of physics and mathematics are applicable to problems in medicine.

1. Smyth, Henry D.: Atomic Energy for Military Purposes. Princeton, N. J.: Princeton University Press, 1945.

DRUG ANEMIA AND LEUCOPENIA AND THEIR CORRECTION

What has seemed to be quite an advance in thyroid therapy was the introduction of thiourea and thiouracil for treatment of toxic goiter. These are among a rather numerous group of

substances which interfere with the absorption of iodine by the thyroid and thus with the formation of thyroxin. The sulfonamides have also some inhibitive action upon thyroid function. Thiouracil and allied drugs have been used most effectively to depress a high basal metabolic rate before surgery, and in some cases have been used instead of surgery to control toxic hyperthyroidism. Sometimes thyroxin is given at the same time to prevent too great a fall of the basal metabolic rate.

In the first group of cases so treated, an instance of agranulocytosis was reported.[1] Subsequent studies have shown not infrequently cases of leucopenia, granulocytopenia or agranulocytosis following the use of these drugs. It has been noted that the granulocytopenia which occurs in rats fed sulfonamides in purified diets is corrected by treatment with *L. casei* factor,[1] or folic acid, a substance derived from the vitamin B group of foods and shown to be an effective anti-anemic in many diseases, including pernicious anemia.[2]

Severe anemia has also been noted in many rats which receive thiourea without thyroxin or thyroid substance; granulocytopenia would seem to occur more often in animals which receive both thiourea and thyroid material. Daft, Kornberg, Ashburn and Sebrell[1] in the National Institute of Health have investigated the effects of these drugs upon rats and the possibilities of correcting the blood dyscrasias. Rats with cell counts of no more than 300 polymorphonuclear granulocytes per cubic millimeter were considered to be granulopenic, and those with hematocrit values of 35 volumes per cent or less were considered anemic. The blood injuries were thus quite severe. The rats were kept on purified diets, and developed the blood dyscrasias usually after only a few weeks. Anemia developed earlier than granulocytopenia. Granulocytopenia did not develop unless thyroxin or thyroid powder was administered simultaneously with thiourea: the conditions, according to the authors, under which clinical agranulocytosis develops.

Many of the rats which were given thiourea developed anemia, and also hemorrhage and necrosis of the adrenals. The animals which received thyroid at the same time became granulocytopenic and leucopenic, while the incidence of adrenal hemorrhage and necrosis was greatly reduced. Apparently thyroid treatment provided some advantageous stimulus to the adrenals. The granulocytopenia and leucopenia of the rats was corrected by treatment with *L. casei* factor, folic acid, just as the granulocytopenia which may follow sulfonamide treatment is corrected by this product.[1]

Thus thyroid injury in itself tended to cause a fall in the red cells and white cells, in many cases to dangerous degrees. If thyroid was supplied, less anemia was noted, but a greater depression of the white cells. Presumably the blood forming organs were injured, and this was relieved by treatment with a substance from the B group, which has been shown to be a remarkable blood stimulant in various clinical conditions.[2]

This work throws light upon the physiology of blood formation in general, which would seem to be very closely bound up with thyroid function; and perhaps upon the various reported cases of agranulocytosis. Certainly it emphasizes the importance of folic acid in the treatment of almost any severe blood cell disturbance.

1. Daft, F.; Kornberg, A.; Ashburn, L. L.; and Sebrell, W. H.: Granulocytopenia in Rats Given Thyrourea and Thyroxin. The Therapeutic Effect of L. casei Factor. Proc. Soc. Exper. Biol. and Med., **61**:155 (Feb.) 1946.

2. Spies, Tom D.; Vilter, Carl F.; Koch, Mary B.; and Caldwell, Margaret H.: Observations of the Anti-Anemic Properties of Synthetic Folic Acid. Sou. Med. Jour., **38**:707, 1945.

TWENTY-FIVE YEARS AGO

From Journals of 1921

South American Expedition.[2]—The World War is over and the menace of a despotic military nation ruling the people of the earth has passed. The part that the United States played in that great conflict will be written in song and story, and it is well for the American youth of future centuries to learn of the valour and high ideals of their ancestors during this great epoch.

Immediately after the signing of the armistice, on November 11, 1918, another great war was begun, in which the United States is playing the leading part in

2. Editorial. The Conquest of Yellow Fever. Sou. Med. J., **14**:430 (May) 1921.

conquering one of the greatest enemies to mankind. The newspapers had but little to say of the American Expeditionary Forces that sailed for the west coast of South America to go into fever-plagued cities to fight a foe that, though unseen up to that time, has "heralded its millions in the dim lands of dreams." The members of this expedition left their native shores without the "sounding of cymbals and the flare of trumpets" that usually cheer the heroic men who go forth to fight for mankind * * * They have already achieved victories which presage the final success of the campaign to rid the world of a disease that during many summers in the past paralyzed the commerce of the Western hemisphere * * *

General Gorgas succeeded in persuading the Rockefeller International Health Board to finance the campaign against yellow fever * * * He * * * took with him to South America Assistant Surgeon-General (Henry Rose) Carter and Colonel Joseph White, of the United States Public Health Service, and Colonel Theodore Lister of the Medical Corps of the United States Army * * * Since the death of General Gorgas * * * General Carter * * * reports that Guaiaquil, Ecuador, and the cities of Peru have been freed from the disease and he believes that the end of yellow fever on the Western hemisphere is in sight.

General Gorgas believed that some of the coast cities of the British colonies and of the countries under British mandate on the west coast of Africa were infected with yellow fever * * * There can be no question that the British Government will carry out the suggestions of General Gorgas * * * and that the last nidus of yellow fever infection on the face of the earth will be eradicated. After yellow fever is gone then malaria must go.

Child Health and Infant Mortality.[3]—Even during the stress and strain of war, England and Belgium, through national supervision of the coming generation, reduced infant mortality to less than the prewar rates. If such results are possible during years of famine and untold suffering, what may not be accomplished in the more beneficent days of peace? * * *

Nineteen states and the District of Columbia have appointed state commissions to revise and codify all laws pertaining to the interest of their children. Thirty-five states as compared with six before the war have definite child welfare divisions with annual appropriations ranging from $1,900 to $150,000. * * *

A wistful and unique tribute was recently paid the nurses of a district association by the local undertakers organization, which lamented the decreased number of infant funerals since the installation of the nursing service * * * The Virginia State Board of Health has begun teaching its teachers * * * We have secured better pumps and privies through the aid of the teachers. * * *

3. Bradley, Frances Sage: Supervision of Pre-School Children and Physical Education. Sou. Med. J., 14:395 (May) 1921.

Book Reviews

War Neuroses. By Roy R. Grinker, Lt. Col., Medical Corps, and John P. Spiegel, Major, Medical Corps, Army Air Forces. 145 pages. Philadelphia: The Blakiston Company, 1945. Price, $2.75.

"War Neuroses" by the authors of "Men Under Stress" represents one of the soundest and most practical books on war psychiatry. It reflects an open-minded, experienced scientific approach to psychopathology. It was written at the end of the Tunisian campaign in North Africa, the case material coming from the Ground Force and Air Force personnel in American and British troops.

The various clinical syndromes which represent the manner in which a personality attempts to deal with overwhelming anxiety are listed as follows:

(1) Free-floating anxiety states, severe and mild.
(2) Somatic regressions.
(3) Psychosomatic visceral disturbances.
(4) Conversion states.
(5) Depressed states.
(6) Concussion states.
(7) Exhaustion states.
(8) Psychotic states.
(9) Malingering.

These syndromes are discussed in detail and elaborated by well chosen case reports. Prognosis and treatment are adequately discussed and the psychobiologic dynamics of these various types of reaction are clearly explained.

The book is most readable. It will live, not alone as a book on war psychiatry, but as a book which tells simply, how and why people behave as they do, under situations of stress, whether it be in a war or civil setting.

The soldiers are not different from people on the streets. War provided a great laboratory for the study of human behavior. It provided the subjects, the setting, the anxiety provoking situations and the organization which made such a contribution possible. Drs. Grinker and Spiegel took advantage of this unique state of affairs and compiled data that is helpful and interesting not only to psychiatrists, but to all physicians seeking enlightenment, and all laymen pondering the whys of human reactions.

It should be required reading for every medical student before graduation, and for every resident in psychiatry before the completion of his service.

Southern Medical News

ALABAMA

The Medical Association of the State of Alabama at its annual meeting in Birmingham in April elected Dr. Carl A. Grote, Huntsville, President; Dr. J. Paul Jones, Camden, Dr. J. O. Morgan, Gadsden, Dr. W. Hill McCaslan, Union Springs, and Dr. B. W. McNease, Fayette, Vice-Presidents; Dr. Douglas L. Cannon, Montgomery, Secretary-Treasurer (reelected). Dr. E. V. Caldwell, Huntsville, Dr. M. S. Davie, Dothan, Dr. K. A. Mayer,

Continued on page 58

THE VALUE OF KNOX GELATINE IN PEPTIC ULCER MANAGEMENT

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Knox Products Keep Pace Through Laboratory and Clinical Research

Continued from page 444

Lower Peach Tree, and Dr. M. Y. Dabney, Birmingham, were reelected to the State Board of Censors, and Dr. John L. Branch, Montgomery was elected to fill the unexpired term of Dr. C. A. Thigpen, Montgomery (resigned). The Association will meet again in Birmingham in 1947 for its Centennial Meeting.

Dr. Wilmot S. Littlejohn, Birmingham, has been named head of the newly created Department of Neurology, Medical College of Alabama, Birmingham; and also Associate Professor of Clinical Medicine for Neurology at the College.

Dr. Samuel C. Little, formerly Instructor in Neurology, University of Michigan Hospital, Ann Arbor, has been named Instructor in Neurology, Medical College of Alabama, Birmingham.

Dr. James O. Pinkston, a native of Dadeville and a teacher in Vanderbilt University, Nashville, Tennessee, in 1937 has joined the American University of Beirut, Lebanon, Syria. He recently arrived in the United States to help raise funds for the $2,500,000 expansion program of the University's Medical Division and to recruit faculty members.

DEATHS

Dr. William Riley Bonds, Winfield, aged 82, died recently of carcinoma.

Dr. Ebb Browne Durrett, Bessemer, aged 61, died March 13.

Dr. Burr Ferguson, Birmingham, aged 73, died recently.

ARKANSAS

Ashley County Medical Society has elected Dr. D. V. Smith, President; and Dr. W. A. Regnier, Secretary-Treasurer, both of Crossett.

Crawford County Medical Society has elected Dr. S. D. Kirkland, Van Buren, President; Dr. S. C. Grant, Mulberry, Vice-President; and Dr. Riley Cowan, London, Secretary-Treasurer.

Chicot County Medical Society has elected Dr. B. C. Clark, Lake Village, President; Dr. W. A. Craig, Eudora, Vice-President; and Dr. M. K. Bottoroff, Lake Village, Secretary-Treasurer.

Dr. Vida Gordon, after a number of years with the U. S. Public Health Service, is now located in Little Rock as Assistant Professor of Pediatrics, University of Arkansas School of Medicine.

Dr. Elizabeth Conforth from the Women's Medical School of Pennsylvania, Philadelphia, is now connected with Department of Pathology of the University of Arkansas School of Medicine, Little Rock.

Dr. J. R. Sloan, Garner, has moved to Beebe.

Dr. John W. Dorman has joined Drs. Sisco and Sisco in practice at Springdale.

Dr. John P. Wood, formerly a resident at Baptist State Hospital, Little Rock, is located at Corning.

Dr. W. E. Berry, Trumann, after completion of postgraduate work at the University of Tennessee, will locate at Jonesboro.

Dr. J. P. Clemens, Stephens, has been elected a Director of the Stephens Security Bank.

Dr. Philip T. Cullen, Little Rock, has returned to practice with Dr. L. F. Barrier, with offices in the Donaghey Building.

Dr. Louis K. Hundley has located in the National Building, Pine Bluff, for practice in eye, ear, nose and throat specialty.

Dr. B. V. Powell, Camden, has been elected Sergeant-at-Arms of the local post, Veterans of Foreign Wars.

Dr. Guy Hodges, Rogers, has associated with him Dr. Lee A. Dean who has been released from military service.

Dr. A. H. Maddox, Elaine, is taking postgraduate work at the University of Tennessee College of Medicine, Memphis.

Dr. James F. Lewis, Fayetteville, on expiration of his terminal leave from military service, will be located with Dr. James T. Doster, Columbus, Mississippi.

Dr. T. H. Jones, Waldo, has been elected Surgeon of the local American Legion Post.

Dr. Gus W. Jones, El Dorado, is taking special work at Charity Hospital, New Orleans, Louisiana.

Dr. Robert G. Young, formerly of Little Rock, has located at Marion, Indiana, after having been released from military service.

Dr. H. H. Atkinson, formerly of Crossett, is associated with Dr. E. E. Estes in practice at Fordyce, after being released from military service.

Dr. W. W. Johnston, Little Rock, has been appointed Director, District Health Unit No. 4, Arkansas State Board of Health, Conway, after being released from military service.

Dr. Thomas K. Mahan, Blytheville, is taking special work in radiology in Chicago.

Dr. Ralph M. Sloan, Jonesboro, has been elected Director of the Rotary Club.

Dr. G. D. Murphy Jr., El Dorado, has been elected Director of the Boys Club.

Dr. W. J. Sheddan, Osceola, has been elected Surgeon of the local Veterans of Foreign Wars Post.

Dr. Jabez F. Jackson, formerly of Walnut Ridge, and Dr. Thomas E. Williams, formerly of Searcy, have purchased the Newport Sanitarium, Newport, from Dr. A. M. Elton and they will be located at Newport.

Dr. A. M. Elton, Newport, has been elected President of the First National Bank.

Dr. Merrieman L. Norwood, Lockesburg, was recently given a dinner by the Arkansas Medical Society in honor of his many years of service to the profession. He was presented with a watch as a memento of the occasion.

Dr. Martha Sue Lewandoski, Little Rock, and Mr. Howard T. Story, St. Joseph, Missouri, were married recently.

DEATHS

Dr. Edward E. Barlow, Dermott, aged 72, died February 6.

Dr. James E. Brittain, Searcy, aged 73, died recently of cardiovascular renal disease.

Dr. C. J. Campbell, Mulberry, aged 72, died February 28.

Dr. C. Alonzo Harding, Ashdown, aged 64, died recently.

Dr. James Fred Hays, Augusta, aged 72, died March 13.

Dr. Benjamin Dane Luck, Pine Bluff, aged 66, died recently.

Dr. Charles H. Nims, Hot Springs National Park, aged 75, died February 6.

Dr. Robert Quincy Patterson, Little Rock, aged 75, died recently.

Dr. Charles Clay Reed, Little Rock, aged 72, died February 16.

Dr. Raymond W. Whittier, Little Rock, aged 58, died March 1.

DISTRICT OF COLUMBIA

George Washington University School of Medicine, Washington, has appointed Dr. James Spencer Dryden, Clinical Instructor in Ophthalmology; Dr. Roy Hertz, Clinical Instructor in Medicine, and Dr. Charles E. Law, Instructor in Medicine.

Dr. Walter A. Bloedorn, Washington, has been elected a Director of the Hamilton National Bank.

Dr. John A. Reed, Washington, has been elected a new member of the Board of Trustees of Health Security Administration, and Dr. Watson W. Eldridge, Dr. Oscar B. Hunter, Dr. Henry C. Macatee and Dr. Margaret M. Nicholson, all of Washington, have been reelected to the Board.

The following have been appointed Associate Editors of the *Medical Annals of the District of Columbia*, upon recommenda-

Continued on page 60

Alcoholism
Senility
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Continued from page 58

tion of the Editor, Dr. Wallace M. Yater; Dr. James N. Greear, Jr., Ophthalmologist; Dr. Donald Stubbs, Anesthetist; Dr. Joseph S. Wall, Pediatrician; and Dr. Charles Stanley White, Surgeon, all of Washington.

Pan American Medical Association, at its meeting held recently in Washington, elected Dr. Winfred Overholser, President; Dr. A. B. Coulter, First Vice-President; Dr. Watson W. Eldridge, Second Vice-President; Dr. Charles H. McEnerney, Third Vice-President; Dr. Frederick A. Reuter, Secretary; and Dr. Paul F. Dickens, Treasurer, all of Washington.

Dr. Harry S. Lewis, Washington, has been reelected President of the Hebrew Home for the Aged; and Dr. Alex Horwitz, Washington, has been elected to the Board of Directors for a three-year term.

Deaths

Dr. Alfred Vandiver Parsons, Washington, aged 82, died recently of bronchopneumonia.

FLORIDA

Seminole County Medical Society has elected Dr. Orville L. Barks, Sanford, President; Dr. Thomas F. McDaniel, Vice-President; and Dr. Frank L. Quillman, Apalachicola, Secretary-Treasurer.

Staff of the Mound Park Hospital, St. Petersburg, has elected Dr. O. O. Feaster, Chief; Dr. A. S. Anderson, Vice Chief and Dr. N. W. Gable, Jr., Secretary. Dr. R. H. Knowlton and Dr. F. H. Langley were elected to the Executive Committee for three-year terms.

Dr. William L. Jennings, Daytona Beach, has reopened offices with practice limited to surgery, gynecology and obstetrics.

Dr. Leland F. Carlton, Tampa, has been presented a certificate of recognition for twenty-five years' continuous membership in the local Kiwanis Club.

Dr. R. Sam Mosley, formerly of Miami, is at the New York Polyclinic Medical School for special work.

Dr. Edwin H. Andrews, Gainesville, has opened a temporary office with practice limited to surgery.

Dr. Donald M. Baldwin, Jacksonville, has reopened his office in the Medical Arts Building, with practice limited to obstetrics and gynecology.

Dr. James L. Borland, Jacksonville, has opened offices at 206 Pearl Street, with practice limited to gastroenterology.

Dr. F. H. Bowen, Jacksonville, has reopened offices with practice limited to surgery.

Dr. James V. Freeman, Jacksonville, has opened offices with practice limited to surgery, gynecology and radium therapy.

Dr. W. Tracy Haverfield, Miami, has opened offices with practice limited to neurologic surgery.

Dr. Charles E. Hebard, Miami, has opened offices in the Huntington Building, with practice limited to proctology.

Dr. Thomas M. Irwin, Jacksonville, has opened offices in the Medical Arts Building with practice limited to otorhinolaryngology.

Dr. Louis M. Orr, Orlando, has opened offices in the Exchange Building with practice limited to urology.

Dr. Eugene D. Simmons, Jacksonville, has opened offices in the St. James Building in association with Dr. Louie Limbaugh with practice limited to internal medicine.

Dr. William H. McCullagh, Jacksonville, has opened offices with practice limited to neurology and psychiatry.

Dr. Charles Monroe Landmesser, Lakeland, and Miss Jessie Norwood Jeffers were married recently.

Dr. Erwin F. Hoffman, Jacksonville, recently resigned as Epidemiologist with the State Board of Health and has accepted the position of Director, Central Florida Health District, with headquarters at Ocala.

Dr. George E. Lacy, Chattanooga, Tennessee, has been apointed Director of Venereal Disease Control for Miami and Dade County.

Deaths

Dr. Andrew Jackson Harness, Miami, aged 62, died recently.

Dr. Ray Walter Karras, Lake City, aged 58, died recently.

Dr. Arthur H. Northrup, Clearwater, aged 70, died recently of cerebral hemorrhage.

GEORGIA

Carroll County Medical Society has elected Dr. W. Steve Worthy, Carrollton, President; Dr. R. L. Berry, Villa Rica, Vice-President; and Dr. H. L. Barker, Carrollton, Secretary-Treasurer.

Clarke-Madison-Oconee Counties Medical Society has elected Dr. John A. Simpson, President; Dr. Guy O. Whelchel, Vice-President; and Dr. Loree Florence, Secretary-Treasurer, all of Athens.

Clayton-Fayette Counties Medical Society has elected Dr. J. R.

Continued on page 62

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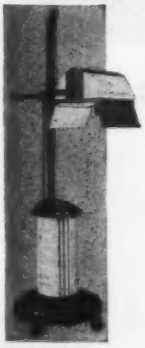

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American Medical Association ACCEPTED

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Continued from page 60

Wallis, Lovejoy, President; Dr. Y. R. Coleman, Jonesboro, Vice-President; and Dr. T. J. Busey, Fayettesville, Secretary-Treasurer.

Cobb County Medical Society has elected Dr. W. H. Perkinson, Marietta, President; Dr. F. P. Lindley, Powder Springs, Vice-President; and Dr. L. L. Welch, Marietta, Secretary-Treasurer.

Coffee County Medical Society has elected Dr. B. O. Quillian, President; and Dr. R. L. Johnson, Secretary-Treasurer, both of Douglas.

Dougherty County Medical Society has elected Dr. W. M. Feild, President; Dr. A. J. James, Vice-President; and Dr. I. M. Lucas, Secretary-Treasurer, all of Albany.

Dr. Benjamin H. Minchew, Waycross, has been awarded the Baynard Knight Cup by the Waycross Kiwanis Club for contributing the most distinguished service to the community the past year.

Dr. J. Mason Baird, Atlanta, has reopened his office in the Medical Arts Building and is associated with Dr. Grady E. Clay.

Dr. Samuel W. Perry, Atlanta, is associated with Dr. H. Bagley Benson, Doctors Building, in the practice of pediatrics.

Dr. Wadley R. Glenn, Atlanta, announces his association with Dr. L. C. Fischer, Crawford W. Long Memorial Hospital, Atlanta.

Dr. Eugene L. Griffin, Atlanta, has opened his office for the practice of obstetrics and gynecology in association with Dr. Lawrence P. Matthews, Atlanta.

Dr. Aubrey L. Huskey, Atlanta, has resumed ear, nose and throat practice with Dr. Calhoun McDougall in the Medical Arts Building, Atlanta.

Dr. James T. King, Atlanta, announces his association with Dr. Leon E. Brawner in the Medical Arts Building, practice limited to ear, nose and throat.

Dr. C. M. Adair, Washington, announces his association with Dr. A. W. Simpson, Dr. C. E. Wills and Dr. Addison Simpson Jr., Washington.

Dr. Sanford E. Ayers, Toccoa, has resigned his commission as a Commander in the Navy to resume his position as Medical Director, La Tourneau Company, Toccoa. He will also engage in private practice.

Dr. Roy Denny, formerly of Alma, is associated with Dr. H. L. Barker, Huff Building, Carrollton.

Dr. Edward Johnson announces his association with his father, Dr. J. A. Johnson, in the practice of medicine at Manchester.

Dr. James D. Menget Jr., Atlanta, is again associated with his father in the practice of medicine and surgery.

Dr. Guy V. Rice, Albany, has rejoined the Georgia Department of Public Health as Assistant Director, Division of Maternal and Child Health with headquarters at Albany.

Dr. Everett S. Sanderson, Augusta, has been granted a leave of absence from the University of Georgia School of Medicine to go to China for an assignment of one year's work with the United Nations Relief and Rehabilitation Administration.

Dr. Robert Daniel Walter, Calhoun, has resumed his practice of medicine at Johnston-Hall Hospital, Calhoun.

Dr. W. D. Willcox, Fitzgerald, announces his association with Dr. Francis Ward, First National Bank Building, for the practice of medicine.

Dr. Alton V. Hallum, Atlanta, was recently elected to membership in the American Ophthalmological Society.

Dr. W. R. Richards, Greensboro, has resigned as Commissioner of Public Health for Greene County.

Deaths

Dr. J. E. Christian, Duluth, aged 78, died recently.
Dr. Holt Darden, Blakely, aged 47, died recently.
Dr. Jesse Weathers Humber, Lumpkin, aged 56, died recently.
Dr. John Dillard Jacobs, Atlanta, aged 71, died recently.
Dr. William Tarlton McCurdy, Stone Mountain, aged 70, died February 13.
Dr. James Daniel Nall, Atlanta, aged 64, died recently.
Dr. George Henry Noble, Atlanta, aged 56, died February 12.
Dr. Samuel T. R. Revell, Louisville, aged 65, died recently.

KENTUCKY

Boyd County Medical Society has elected Dr. George Bell, Ashland, President; Dr. H. K. Bailey, Pikeville, Vice-President; Dr. C. K. Kercheval, Ashland, Treasurer; and Dr. J. P. Scott, Secretary.

Calloway County Medical Society has elected Dr. C. H. Jones, Lynn Grove, President; Dr. Ora K. Mason, Murray, Vice-President; and Dr. J. A. Outland, Murray, Secretary-Treasurer.

Graves County Medical Society has elected Dr. James Edmund Albritton, Hopkinsville, President; Dr. J. Steele Robbins, Mayfield, Vice-President; and Dr. George M. Jewell, Paris, Secretary-Treasurer.

Caldwell County Medical Society has elected Dr. J. M. Moore, President; Dr. Frank T. Linton, Vice-President; and Dr. W. L. Cash, Secretary, all of Princeton.

Four County Medico-Dental Society has elected Dr. L. A.

Continued on page 64

CAMP

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Patient of intermediate type-of-build (skeleton indrawn)

This lumbosacral support is specifically designed to limit the range of the lumbar spine bending when either the framework or soft tissues of the low back are the seat of injury or disease. Effective support is given the gluteal region, the lumbar spine and the sacro-iliac and lumbo-sacral joints. The adjustment about the pelvic girdle prevents undue pressure of the upper adjustments and yet the presence of the center adjustment gives relief and comfort to the patient. Provision is made for reinforcement with aluminum uprights when indicated.

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If you do not have a copy of our "Reference Book for Physicians and Surgeons", copy will be sent upon request.

Continued from page 62

Crosby, Marion, President; Dr. P. J. Frazar, Marion, Vice-President; and Dr. W. L. Cash, Princeton, Secretary, reelected.

Lincoln County Medical Society has elected Dr. Paul Moore, Burkesville, President; Dr. M. Lee Piper, Moreland, Vice-President; and Dr. Lewis J. Jones, Hustonville, Secretary-Treasurer.

Dr. Charles K. Bush, Jr., Louisville, has been serving a residency in psychiatry at the Elgin State Hospital, Elgin, Illinois, after which he plans to return to Louisville and specialize in psychiatry.

Dr. Owsley Grant and Dr. Robert Lich, Jr., Louisville, announce their association in diseases of the genito-urinary system, located in the Heyburn Building.

The staff of Norton Memorial Infirmary, Louisville, has elected Dr. Joseph C. Bell, President; Dr. F. Buerk Zimmerman, Vice-President; and Dr. John D. Gordinier, Secretary-Treasurer.

The staff of Kentucky Baptist Hospital, Louisville, has elected Dr. J. A. Bowen, President; Dr. James Winter, Vice-President; Dr. Frank Hower, Secretary; and Executive Committee: Dr. Charles Edelen, Dr. William Ray Moore and Dr. Marion F. Beard.

Dr. Thomas P. Leonard, Frankfort, has been named Health Officer of this city, a position he held prior to entering military service.

Dr. Philip H. Dorger, Covington, was recently guest of honor at a dinner given in observance of his completion of twenty-five years as a member of the staff of St. Elizabeth Hospital, Covington.

Deaths

Dr. Francis Smith Clark, Louisville, aged 77, died February 20.

Dr. William Andrew McKenney, Falmouth, aged 78, died recently of heart disease.

Dr. B. F. McClure, Jackson, aged 97, died February 4.

Dr. Charles Montgomery Russell, Columbia, aged 75, died recently of chronic myocarditis.

Dr. A. L. Smithers, Chaplin, aged 85, died February 25 of injuries suffered when the car he was driving collided with a truck.

Dr. George W. Pectol, Fern Creek, aged 75, died February 17.

Dr. Robert Thomas Rudd, Fulton, aged 76, died recently of pneumonia.

LOUISIANA

The staff of Baptist Hospital, New Orleans, has elected Dr. John T. Sanders, Chairman; Dr. J. Kelly Stone, Vice-Chairman; Dr. Garland Walls, Secretary; and Dr. Jos. Wells, Treasurer. Executive Committee: Dr. W. Robyn Hardy, Chairman, Dr. Sam Hobson, Dr. Eugene Countiss and Dr. P. H. Jones.

The staff of DePaul Sanitarium, New Orleans, has elected Dr. Charles S. Holbrook, President; Dr. H. Randolph Unsworth, Vice-President; and Dr. Louis J. Dubos, Secretary.

Dr. Maxwell E. Lapham, after being released from the Navy, has returned to his position as Dean, Tulane University of Louisiana School of Medicine, New Orleans.

Dr. Rudolph Matas, New Orleans, was recently presented a gold plaque in honor of his completion of fifty years as a member of the staff of the Touro Infirmary. Dr. Matas was graduated at Tulane University of Louisiana School of Medicine, New Orleans, in 1880.

Tulane University of Louisiana Medical School, New Orleans, has been left $100,000 by the late Dr. Henry E. Menage, Emeritus Professor of the School. The fund, the Henry E. and Henrietta Menage Research Fund in Dermatology, will be used for medical research on the causes, prevention and cure of diseases of the skin. The school has also received $5,000 from the Medical Research Division of Sharp and Dohme, Philadelphia, to be used in the continuation of research on sulfathalidine and tyrothricin, under the direction of Dr. Chapman G. Johnson, Assistant Professor of Gynecology and Obstetrics.

Dr. Harry C. Knight, U. S. Marine Hospital, New Orleans, has moved to Federal Correctional Institute, Danbury, Connecticut.

Dr. Roscoe P. Kandle, New Orleans, has moved to New York City.

Dr. Bertha E. Stokes, New Orleans, has moved to Donaldsonville.

Dr. D. J. Thibodaux, Jr., New Orleans, has moved to Madisonville.

Dr. Oran V. Prejean, New Orleans, has moved to Dallas, Texas.

Dr. Joseph Cohen, New Orleans, was recently elected a Fellow in The Royal Society of Medicine of England.

Dr. J. Henry Larose, New Orleans, was recently made a Diplomate of the American Board of Ophthalmology.

School of Tropical Medicine, Tulane Medical School, New Orleans, has been allotted $10,000 by the National Institute of Health, Bethesda, Maryland to be used for investigative work in amebiasis.

Tulane University of Louisiana School of Medicine, New Orleans, announces the following new appointments: Dr. Maxwell Leonard Littman, Instructor in Bacteriology; Dr. Joseph Edwin Schenthal, Instructor in Medicine; Dr. Harry Corbett Tiller, Instructor in Medicine; and Dr. Richard P. Vieth, Instructor in Pediatrics.

Deaths

Dr. Lionel Joseph Bienvenu, Opelousas, aged 49, died February 8.

Dr. Chester Arthur Stewart, New Orleans, aged 55, died February 8 of coronary occlusion.

Dr. Paul G. Lacroix, New Orleans, aged 58, died March 23.

MARYLAND

Dr. Walter D. Wise, Baltimore, has been appointed Chairman of a new hospital survey committee named by the Committee on Medical Care of the Maryland State Planning Commission.

Dr. Hugh W. Ward, Owings, is Deputy and Health Officer of Calvert County.

Dr. Edward Davens, Baltimore, has been reinstated as Chief of the Bureau of Child Hygiene, State Department of Health; and Dr. Theodore R. Shrop as Deputy State and Health Officer of Howard County.

Dr. Stanley H. Hoffman, Glenn Dale, and Miss Teresa R. Blumberg, Terre Haute, Indiana, were married recently.

Deaths

Dr. Raymond V. Glann, Baltimore, aged 67, died recently of coronary disease.

Dr. Samuel Lee Magness, Baltimore, aged 67, died recently of cerebral hemorrhage.

Dr. Samuel Arthur Nichols, Clarksville, aged 75, died recently of coronary thrombosis.

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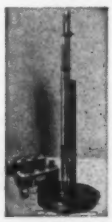

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An important adjunct in treating cases of shock.

For determining blood proteins, albumin-globulin ratio and specific gravity of body fluids. These units are produced exclusively with the cooperation of H. G. Barbour and W. F. Hamilton and approved by them.

This outfit is now available in two models—the larger model comes complete for $65 and the small model at $35. Prices f.o.b. Towson 4, Maryland.

This service includes a series of similar outfits for conducting the following accurate tests: Blood Sugar, Blood Urea, Sulfathiazole and the Sulfonamide Compounds in Blood and Urine. Iceterus Index, Phenolsulfonphthalein, Urine pH, Blood pH, Gastric Acidity, Calcium-Phosphorus, Blood Bromides.

If you do not have the LaMotte Blood Chemistry Handbook, a complimentary copy will be sent upon request without obligation.

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The LUCK BONE SAW (shown above) relieves the surgeon of tiresome hand drilling and cutting. The high speed slotting burrs are invaluable in bone graftings.

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The TWO-SPEED HAND DRILL is the answer to a demand for a UNIVERSAL tool of this kind.

These and many other new items now available.

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Continued from page 64

MISSISSIPPI

Dr. David S. Pankratz, since 1939 Professor of Anatomy, University of Mississippi School of Medicine, University, has been made Acting Dean, succeeding Dr. Billy S. Guyton. Dr. Guyton resigned in February to become Dean Emeritus and Professor of Surgery. Dr. Pankratz has been Assistant Dean and Chairman of the Department of Anatomy since June 1945.

Dr. Robert E. Schwartz, Hattiesburg, has been elected Governor of the American College of Chest Physicians for the state of Mississippi to succeed Dr. John S. Harter, formerly of the State Sanatorium. Dr. Harter is Chief Thoracic Surgeon, Hazelwood Sanatorium, Louisville, Kentucky.

Dr. Harvey F. Garrison, Jr., Jackson, has been released from the Army and has resumed the practice of pediatrics with The Children's Clinic, Jackson.

DEATHS

Dr. John Edgar Davis, Columbus, aged 78, died recently of cardiorenal disease.

Dr. Andrew Patterson McArthur, Moss Point, aged 83, died recently of bronchopneumonia and cardiorenal disease.

MISSOURI

Missouri State Medical Association at its recent annual meeting in St. Louis installed Dr. Harold Goodrich, Hannibal, President; and elected Dr. Morris Simpson, Kansas City, President-Elect. Kansas City was chosen for the 1947 meeting.

Lafayette County Medical Society has installed Dr. E. S. Wallace, Lexington, President; and elected Dr. Ben Brasher, Lexington, President-Elect; and Dr. E. M. Moore, Jr., Higginsville, Secretary-Treasurer.

Pulaski County Medical Society has elected Dr. C. Mallette, Crocker, President; Dr. C. Miller, Waynesville, Vice-President; and Dr. R. W. Reed, Richland, Secretary-Treasurer.

Randolph-Monroe Counties Medical Society has elected Dr. J. William Fleming, Moberly, President; Dr. P. V. Dreyer, Huntsville, Vice-President; and Dr. F. W. Barnett, Paris, Secretary-Treasurer.

Missouri Social Hygiene Association has made Dr. Richard S. Weiss, St. Louis, an Honorary President; and Dr. Paul Zantay, Dr. G. O. Broun, Dr. A. H. Conrad and Dr. John V. Lawrence, Vice-Presidents; and Dr. Carl A. Wattenberg and Dr. J. E. Mitchell were named to the Board of Directors.

Dr. O. S. Pate, North Kansas City, has been appointed Coroner of Clay County.

Dr. B. L. Murphy, Hannibal, has resumed the position of City Physician, relieving Dr. E. R. Motley who served during his absence in service.

Dr. William J. Cremer, Nevada, has been appointed Superintendent, State Hospital No. 1, Fulton, replacing Dr. C. C. Ault, who resigned to enter private practice in Little Rock, Arkansas.

Dr. J. A. Cline, Oran, was recently honored at a banquet given by the Chamber of Commerce.

Dr. Wilbur McDonald, St. Joseph, has been named to the Board of Directors of the Buchanan County Tuberculosis Society, filling a vacancy caused by the resignation of Dr. H. E. Petersen.

Dr. Seth S. Barnes, Cape Girardeau, has moved to Waynesville where as Health Officer he will direct the Pulaski County health program.

The staff of Independence Sanitarium, Kansas City, has elected Dr. Fred W. Hink, President, and Dr. R. F. Gard, President Elect. Dr. Vance Link was reelected Secretary and Treasurer.

Dr. Merrill D. Evans, Kansas City, and Miss Mary Gentilcore, Youngstown, Ohio, were married February 9.

Dr. Melvin L. Peters, Cameron, and Miss Gussie Gearhart, Princeton, were married recently.

DEATHS

Dr. Frank H. Caughell, Hermann, aged 83, died recently of diabetes mellitus.

Dr. Henry Tyler Coleman, Pattonville, aged 71, died recently of coronary occlusion.

Dr. Adolphus Jackson Crider, Dixon, aged 60, died recently of coronary occlusion.

Dr. Edgar S. Harris, Independence, aged 68, died recently of uremia.

Dr. Edmund Lee Harrison, Kansas City, aged 82, died recently of chronic myocarditis and arteriosclerosis.

Dr. William Adolph Kluegel, St. Louis, aged 62, died recently of cardiac decompensation.

Dr. William E. Messenger, Independence, aged 83, died recently.

Dr. William Lucas Perry, St. Louis, aged 82, died recently of coronary occlusion.

Dr. Ferdinand Shoemaker, Kansas City, aged 77, died recently of carcinoma of the colon.

Dr. Alex S. Wolf, St. Louis, aged 75, died recently of acute pulmonary edema.

NORTH CAROLINA

South Atlantic Association of Obstetricians and Gynecologists, at its annual convention held at Sedgefield recently, installed Dr. Robert A. Ross, Durham, President; and elected Dr. J. Randolph Purdue, Miami, Florida, President-Elect; and Dr. Tiffany J. Williams, Charlottesville, Virginia, Secretary-Treasurer.

Second District Medical Society has elected Dr. J. S. Rhodes, Sr., Williamston, President; and Dr. Claudius McGowan, Plymouth, Secretary and Treasurer.

Dr. G. Fred Hale, Raleigh, has been appointed to fill the unexpired term of Dr. Clyde E. Minges, Rocky Mount, who recently resigned from the State Medical Care Commission.

Bowman Gray School of Medicine of Wake Forest College, Winston-Salem, has received from Gordon Gray, son of the late Bowman Gray, a gift of $125,000 which will be used to develop a Department of Psychiatry.

Wake Forest College Board of Trustees on March 26 acted favorably on an offer from the Z. Smith Reynolds Foundation of an endowment fund with a market value at present of $10,500,000, the offer stipulating that Wake Forest College be moved to Winston-Salem where the Bowman Gray School of Medicine of Wake Forest College and the North Carolina Baptist Hospital are now located. Final decision in the matter will be made by the North Carolina Baptist State Convention.

Dr. Hector H. Henry, Charlotte, has been named Venereal Disease Control officer for the city.

Continued on page 68

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Conserves mother's time and energy in straining fresh vegetables and fruits. With just a few twists of the wrist, the Foley Food Mill separates fibres and hulls and purees any cooked food fine enough for the smallest baby or for any adult diet—peas, carrots, beets, string beans, spinach, apple sauce, prunes. Made of steel, rust- and acid-resistant. At department and hardware stores.

Regular price $1.50. Special price to doctors, for display, 1 only $1.00 postpaid.

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Both products provide simple, reliable tests that can be conveniently used and safely carried by physicians and public health workers. They are equally satisfactory for large laboratory operations. Clinitest is also available in special Tenite plastic pocket-size set for patient use.

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ALBUMINTEST—in bottles of 36 and 100.

CLINITEST—***Laboratory Outfit (No. 2108)*** includes tablets for 180 tests; additional tablets can be purchased as required. ***Plastic Pocket-Size Set (No. 2106)*** includes all essentials for testing. ***Clinitest Reagent Tablets (No. 2101)*** 12 x 100's for laboratory and hospital use.

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WANTED—Eye, Ear, Nose and Throat physician for hospital group; central Kentucky. Address HCC, care Southern Medical Journal.

GENERAL SURGEON—Completed four year residency in general surgery in a hospital approved for training residents, associate F.A.C.S., desires permanent association with established surgeon or group. Married, 31 and gentile. Released in March following 26 months active medical and surgical work. Well trained. Excellent references. W. J. McKinnon, M.D., Box K, Corner Florence and College Street, Maxton, N. C.

WANTED—Immediately, young doctor assistant to pediatrician in Kansas City, Missouri. Write PFS, care Southern Medical Journal, or wire.

WANTED—Assistant in general practice for a thriving coal mining community either on a temporary or permanent basis; prevailing wages of the community; pleasant surroundings. House furnished if need one. Contact Dr. J. H. Murry, Kimball, West Virginia, or phone 2681.

PATHOLOGIST, Board Diplomate, competent and experienced in pathologic anatomy, frozen section diagnosis, clinical pathology and tropical diseases; professor, consultant and executive; laboratory director and research associate in distinguished organization; numerous publications, excellent references; age 40. Desire association with substantial hospital or accomplished clinical group. Write PGJ, care Southern Medical Journal.

HEALTH OFFICERS WANTED—Positions are open in Georgia for county and district commissioners of health. Salaries for experienced public health physicians range from $4,800 to $6,600. Salaries for physicians with public health training who are entering the field range from $3,960 to $4,920. Liberal travel allowances supplement these salaries. Tenure of office is assured by a merit system. License to practice medicine in Georgia is required. Ample opportunities for training are offered with liberal stipend while in training. Write T. F. Abercrombie, M.D., Director, State Health Department, State Office Building, Atlanta 3, Georgia, for application forms and full details.

TUBERCULOSIS CONTROL OFFICERS WANTED—A program of increased emphasis on the control of tuberculosis requires nine additional tuberculosis control officers in the Georgia Department of Public Health. Salaries range from $4,800 to $6,600 plus travel expenses, according to education, experience, duties assigned and length of service. Some positions are available for physicians experienced in tuberculosis diagnosis and treatment who do not yet have public health experience. Write T. F. Abercrombie, M.D., Director, State Health Department, State Office Building, Atlanta 3, Georgia, for application forms and full details.

FOR SALE—A complete 14-bed hospital, with a six-room clinic in connection. The hospital is now ready to open to public. It is located in the richest cotton and cattle country of the State of Arkansas. The surrounding territory has 18,000 people. Nearest hospital twenty-five miles. Sell for invoice plus 15 per cent. Sudden development of poor health. Address BFJ, care Southern Medical Journal.

FOR SALE—Complete Ear, Nose and Throat set-up. Ritter Unit, Maico, all instruments and cabinets. New. Melvin W. McGehee, M.D., Huntington, West Virginia.

FOR SALE—A treatment chair and complete case of eye refraction equipment; an operating table and surgical instruments; and various pieces of electrical equipment. For full particulars, write Dr. R. C. Boothe, P. O. Box 408, Ft. Pierce, Florida.

FOR SALE—Approximately fifty handy urological instruments belonging to the late Dr. T. E. Blackshear: Sounds, followers, retractors, endoscopes, dilators, urethrotomies, forceps, syringes, etc. For particulars, address Mrs. T. E. Blackshear, 511 N. Barcelona Street, Pensacola, Florida. Phone 4833.

Continued from page 66

Dr. William K. McDowell, Tarboro, has resigned as Health Officer of Halifax County.

Dr. Robert P. Morehead, Winston-Salem, has been appointed Educational Director of the North Carolina Division of the field army of the American Cancer Society.

Dr. Charles B. Davis Jr., Wilmington, has resigned as Director, Division of Industrial Hygiene of the North Carolina State Board of Health, and will return to private practice in Wilmington. He is succeeded by Dr. Otto J. Swisher Jr., Southern Pines, who prior to his entry in military service served as Director, Division of Industrial Hygiene of the West Virginia State Board of Health and as Health Officer of Covington, Tennessee.

Dr. Charles W. Brown Jr., Hamlet, and Miss Lois Little, Connersville, Indiana, were married recently.

Dr. David Sanford Citron, Charlotte, and Miss Doris Berman, Waterbury, Connecticut, were married February 14.

Dr. Charles Kendall Donegan and Miss Margaret Graham Mangum, both of Durham, were married recently.

Dr. Hugh Dortch Jr., and Miss Mae Joyce Whitfield, both of Durham, were married February 2.

Dr. Harold D. Freedman, Lenoir City, and Miss Marjorie E. Fennen, Cincinnati, Ohio, were married February 9.

Dr. William Duer James Jr., Hamlet, and Miss Sara Brooks Nair, Clifton Forge, Virginia, were married recently.

Dr. Oscar Lee McFadyen Jr., Fayetteville, and Miss Frances Donald Cochran, Statesville, were married recently.

Dr. John David Taylor, Winston-Salem, and Miss Alma Louise Moore were married recently.

Dr. A. Ray Dawson, Greensboro, has been appointed Chief of Medical Rehabilitation in the Richmond branch office of the Veterans Administration.

Dr. Bennett E. Stephenson, Plymouth, will be associated with Dr. R. B. Outland at Rich Square in the practice of medicine.

Dr. James A. Brown has resigned from the staff of Grace Hospital, Banner Elk, to establish a general medical practice in Cleveland, Ohio.

Dr. John C. Reece, Winston-Salem, is head of the Department of Pathology, Grace Hospital, Morganton.

Good Hope Hospital, Erwin, has elected Dr. P. G. Parker, Chief of Staff; and Dr. W. E. Adair Jr., Assistant Chief of Staff and Secretary of the Hospital Staff. Members of the Executive Committee are Dr. Clarence L. Corbet and Dr. L. R. Doffermyre of Dunn and Dr. P. G. Parker, Erwin.

Wilson County Chapter of the Wake Forest Alumni has elected Dr. G. Erick Bell, Wilson, President. Dr. H. W. Stevens is Secretary and Treasurer.

Dr. C. F. Irons and his wife, Dr. Mahleen Irons, have entered practice in Greenville.

Dr. Harold B. Kernodle will be associated with Dr. George L. Carrington and Dr. Ralph E. Brooks, Burlington, being in charge of traumatic surgery and also practicing general surgery.

Dr. Harry L. Johnson, Greensboro, has been appointed Surgeon-in-Chief, Hugh Chatham Memorial Hospital, Elkin.

Dr. Adam T. Thorp, Rocky Mount, announces that his practice in the future will be limited to obstetrics and gynecology.

Deaths

Dr. Joseph Vance Davis, Waynesville, aged 24, died recently while in Boston serving an internship.

Dr. Joy Harris Glascock, Greensboro, aged 82, died recently of myocarditis.

Dr. James Sibert Gamble, Lincolnton, aged 27, died recently when his private plane crashed.

OKLAHOMA

Southwest Medical Society has elected Dr. D. D. Pearson, Mangum, President; Dr. A. W. Paulson, Clinton, Vice-President; and Dr. W. A. Starkey, Altus, Secretary and Treasurer.

Dr. Lewis J. Moorman, Oklahoma City, has been appointed Consultant by the Veterans Administration in line with their policy to bring civilian medical consultants into the Veterans Medical Program.

Dr. J. D. Osborn, Frederick, has been elected President-Elect of the Federation of Medical Boards of the United States to serve in 1947.

Deaths

Dr. Samuel Ralston Bates, Wagoner, aged 73, died recently of valvular heart lesion and pulmonary tuberculosis.

Dr. A. L. Davenport, Holdenville, aged 72, died recently.

Dr. Breckenridge Johnson Duckett, Muskogee, aged 78, died recently of injuries received when he was struck by an automobile.

Dr. W. E. Floyd, Holdenville, aged 66, died recently.

Dr. C. M. Fullenwider, Muskogee, aged 68, died recently.

Dr. James Worrall Henry, Cheyenne, aged 57, died recently of congestive heart failure.

Continued on page 70

The New Emmert-Gellhorn Pessary

An improved device for treatment of inoperable uterine prolapse

For use in cases of inoperable uterine prolapse, this new pessary is offered as an improvement upon the well-known Gellhorn Pessary, long used with great success. The Emmert-Gellhorn Pessary is made of one solid piece of Neicomold, a synthetic material that may be boiled. The material is unbreakable and stays smooth in use since it is unaffected by the genital secretions. Neither does it affect or irritate the vaginal mucosa. The shape is approximately that of a mushroom, with the upper surface slightly depressed.

Instead of a solid stem, the Emmert-Gellhorn Pessary employs a stem having a hole drilled throughout its length. This offers the considerable advantage of drainage, preventing accumulation of dammed-up secretions. This permits fewer removals of the pessary for cleaning, of great benefit to the patient, particularly since many of those using this pessary are aged and find such frequent manipulation and visits to the physician a severe handicap.

The stem of the new pessary is ¼ inch shorter than that of the former pattern, and does not terminate in the knob formerly used. A slight hollowing of the stem near the end, however, allows easy grasp for removal. In weight, the Emmert-Gellhorn Pessary has the advantage of being considerably lighter. This decreased weight also adds to the comfort of the patient.

PRICE—JE5162 — Emmert-Gellhorn Pessary, Diameter 2 or 2½ inches, STATE SIZE, Each $2.25

SPECIAL SIZES: 2¼, 2¾ or 3-inch may be had on order, at each $2.75

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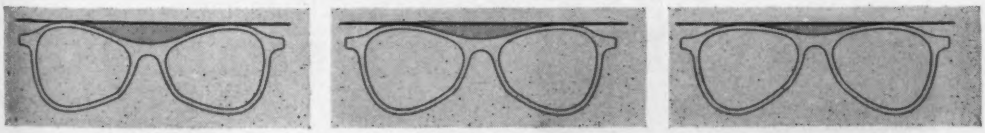

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Obtained by using lens pattern S3-7L.

MEDIUM CREST
Obtained by using lens pattern S3-7.

HIGH CREST
Obtained by using lens pattern S3-7H.

Continued from page 68

SOUTH CAROLINA

South Carolina Medical Association will hold its annual meeting at Ocean Forest Hotel, Myrtle Beach, April 30 to May 2.

Columbia Medical History Club, Columbia, has elected Dr. A. F. Burnside, President; Dr. L. E. Madden, Vice-President; and Dr. B. N. Miller, Secretary-Treasurer.

South Carolina State Hospital, Columbia, has had the following members resign: Dr. Wm. M. Fox, Radiologist, now at Garfield Hospital, Washington, D. C.; Dr. Buford S. Chappel, Resident Urologist, now at University of Virginia, Charlottesville, Virginia; and Dr. J. T. Cuttino, now Resident Pathologist, Duke University Hospital, Durham, North Carolina.

Dr. A. Judson Graves, Columbia, has taken the position as Radiologist at Columbia Hospital.

Dr. Joseph E. Brown, Columbia, is associated in the practice of orthopedic surgery at the Moore Clinic. Prior to his naval service he was practicing orthopedic surgery at the Cleveland Clinic, Cleveland, Ohio.

Dr. Phil Coleman, Columbia, has taken a position on the teaching staff of the Medical College of Virginia, Richmond.

Dr. David A. Wilson, formerly of East Liverpool, Ohio, and of Duke Hospital, Durham, North Carolina, has opened offices in Greenville for the practice of surgery.

Dr. William Schulze, formerly with Duke University School of Medicine, after being released from military service is located in Greenville, associated with Dr. Hugh Smith in internal medicine.

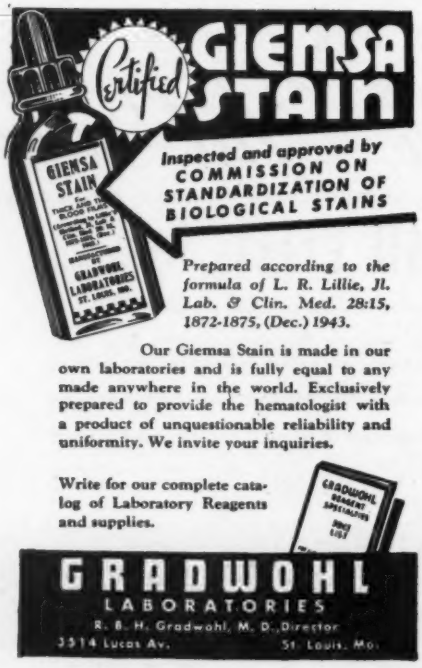
Dr. C. L. Guyton has resumed his position as Director of the Division of Cancer Control and has also been appointed Director, Division of Venereal Disease Control.

Dr. Harold Preston Burbage and Miss Zylphya Elizabeth Haywood, both of Charleston, were married recently.

Dr. Claude Henry Workman Jr., McCormick, and Miss Ruth Bennett, New Orleans, Louisiana, were married February 17.

Dr. Francis Preston Owings, Union, and Miss Carrie Shell Cathcart were married February 23.

Dr. James Edward Wheeler, Columbia, and Miss Carol Jane Allen, New York City, were married March 4.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DEATHS

Dr. John Ramsey Harrison, Greer, aged 53, died recently of a fractured skull received in a fall.

Dr. Henry Leonidas Scarborough, Conway, aged 59, died recently of coronary thrombosis.

Dr. John Perry Young, Chester, aged 75, died recently of pneumonia and nephritis.

Dr. Robert Boyd Stith, Mullins, aged 60, died February 1.

TENNESSEE

Anderson-Campbell Counties Medical Society has elected Dr. J. M. Cox, Lake City, President; Dr. M. L. Davis, La Follette, Vice-President for Campbell County; Dr. Roscor C. Pryse, La Follette, Secretary.

Hamblen County Medical Society has elected Dr. F. F. Painter, President; Dr. L. W. Nabors, Vice-President; and Dr. Y. A. Jackson, Secretary, all of Morristown.

Cocke County Medical Society has elected Dr. C. W. Ruble, President; and Dr. Drew A. Mims, Secretary, both of Newport.

Lincoln County Medical Society has elected Dr. R. E. McCown, President; Dr. J. V. McRady, Vice-President; and Dr. Ben H. Marshall, Secretary, all of Fayetteville.

Dr. A. Louis Buell, Celina, is now located at the Newman Clinic, Shattuck, Oklahoma.

Dr. Joseph McKinney Ivie, formerly of Rochester, Minnesota, is associated with Drs. McClure and Lanier in the practice of radiology, Doctors Building, Nashville.

Dr. George W. Tharp, after being released from military service, is again associated with Dr. Eugene Abercrombie, practice limited to radiology, in the Medical Arts Building, Knoxville.

Dr. Randolph Armistead Cate, Nashville, and Miss Marcella Shinnick, Thompson, North Dakota, were married recently.

Dr. William Thomas Daniel, Franklin, and Captain Ruth Stratton, Beaver Falls, Pennsylvania, were married February 1.

Dr. Isadore Vanet Epstein, Memphis, and Miss Gertrude Sylvia Berman, Washington, D. C., were married February 10.

Dr. LeRoy B. Matthews, Memphis, and Miss Polly Shaw Townsend, Columbia, South Carolina, were married February 17.

Dr. Franklin Caswell Miles, Nashville, and Miss Eugenia Frances Newsome, Sandersville, Georgia, were married February 11.

DEATHS

Dr. Luther Erskin Boone, Chattanooga, aged 66, died recently.

Dr. Robert Franklin Goodman, Boyds Creek, aged 77, died recently of injuries received in a fall.

Dr. Garland Franklin Cummins, Nashville, aged 81, died recently.

Dr. Pugh Haynes, Woodlawn, aged 85, died recently.

Dr. Stonewall Jackson Rollow, Clarksville, aged 80, died recently of heart disease.

TEXAS

Post Graduate Medical Assembly of South Texas will hold its twelfth annual meeting at Houston, Texas, Rice Hotel, December 3-5. Office of Executive Committee: 229 Medical Arts Building, Houston, Texas.

Harris County Medical Society has elected Dr. Mylie E. Durham, President; Dr. J. Wade Harris, Vice-President; Dr. H. L. Alexander, Secretary; and Dr. J. Reese Blundell, Treasurer, all of Houston.

Hays-Blanco Counties Medical Society has elected Dr. M. C. Williams, President; Dr. R. F. Sowell, Vice-President; and Dr. J. R. de Steiguer, Secretary-Treasurer, all of San Marcos.

Henderson County Medical Society has elected Dr. R. E. Henderson, Athens, President; Dr. A. C. Horton, Brownsboro, Vice-President; and Dr. Don Price, Athens, Secretary-Treasurer.

Hidalgo-Starr Counties Medical Society has elected Dr. Ralph Hamme, President; Dr. Joe May, Vice-President; and Dr. Lloyd M. Southwick, Secretary, all of Edinburg.

Hunt-Rockwall-Rains Counties Medical Society has elected Dr. S. D. Whitten, Greenville, President: Dr. H. M. Bradford, Greenville, Vice-President; and Dr. Harriet N. Rogers, Commerce, Secretary-Treasurer.

Lamar County Medical Society has elected Dr. Marcellus A. Walker, Jr., President; Dr. John A. Stephens, Vice-President; and Dr. Robert L. Lewis, Jr., Secretary-Treasurer, all of Paris.

LaSalle-Frio-Dimmit Counties Medical Society has elected Dr. Wendell Beall, President; Dr. E. M. Howard, Vice-President; Dr. M. H. Bannister, Secretary-Treasurer, all of Pearsall.

Lee County Medical Society has elected Dr. S. W. Mantzel, President; and Dr. W. E. York, Secretary-Treasurer, both of Giddings.

Liberty-Chambers Counties Medical Society has elected Dr. Frank Guffin, Liberty, President; Dr. George H. Fahring, Anahuac, Vice-President; and Dr. E. R. Richter, Dayton, Secretary-Treasurer.

Continued on page 72

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Combinations of Theocalcin and digitalis are frequently prescribed to improve cardiac function in congestive heart failure. In other cases, when digitalis fails to give relief, Theocalcin in doses of 1 to 3 tablets t.i.d. is often effective.

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Continued from page 70

Limestone County Medical Society has elected Dr. R. E. Cromeans, President; Dr. O. T. Christoffer, Vice-President; and Dr. Marion M. Brown, Secretary-Treasurer, all of Mexia.

Dr. W. Compere Basom, Dallas, announces the opening of his office in the practice of bone and joint surgery at 2603 Welborn Street.

The staff of Providence Hospital, Waco, has elected Dr. M. B. Ainsworth, President; Dr. Thomas M. Oliver, Vice-President; and Dr. Maurice C. Barnes, Secretary.

The staff of Jefferson Davis Hospital, Houston, has elected Dr. C. A. Calhoun, President; Dr. W. A. Red, Vice-President; Dr. Clyde M. Warner, Chief of Surgical Division; and Dr. W. A. Clark, Secretary.

The staff of Lamar Hospital, Paris, has elected Dr. John Arch Stephens, Chairman.

Texas Memorial Library, the Library of the State Medical Association of Texas, has received a $1,000 war bond from Dr. and Mrs. Witten B. Russ, San Antonio, parents of the late Dr. Stirling Everett Russ, to establish the Dr. Stirling E. Russ Endowment Fund.

Dr. Cyril Joseph Costello, Temple, and Miss Julia Ann Leahy were married recently.

Deaths

Dr. E. Y. Anthony, Omaha, aged 76, died recently.

Dr. Edwin Lee Burton, McKinney, aged 81, died recently of a heart attack.

Dr. Louis Lee Edwards, San Marcos, aged 65, died recently of coronary thrombosis.

Dr. Stirling Everett Russ, San Antonio, aged 40, died recently of heart disease.

Dr. Billy True Wickens, Strawn, aged 33, died recently of wounds received in action.

Dr. John Holt Sewell, Fort Worth, aged 61, died recently.

Dr. Robert Lawson Hargrave, Wichita Falls, aged 74, died recently.

Dr. Thomas A. Guillory, Groesbeck, aged 63, died recently.

Dr. Ezra E. Dickason, Brownsville, aged 70, died recently of myocardial failure.

Dr. Ernest A. Hancock, Ranger, aged 78, died recently of heart disease.

Dr. Edwin Taylor Morris, San Benito, aged 58, died recently of congestive heart disease.

VIRGINIA

Tri-State Medical Association of the Carolinas and Virginia at its recent annual meeting installed Dr. John Wyatt Davis, Lynchburg, President; and elected Dr. S. Raymond Thompson, Charlotte, North Carolina, President-Elect; Dr. J. Asa Shield, Richmond, Dr. W. W. Fennell, Rock Hill, South Carolina, and Dr. R. B. Davis, Greensboro, North Carolina, Vice-Presidents; and Dr. J. M. Northington, Charlotte, North Carolina, Secretary-Treasurer, reelected. The 1947 meeting will be held at Greensboro, North Carolina.

Lynchburg Academy of Medicine has elected Dr. Edwin A. Harper, President; Dr. Holcombe H. Hurt, Vice-President; and Dr. Harry W. Hollingsworth, Secretary, all of Lynchburg.

Dr. James K. Blalock, Marion, was elected Vice-President of the Mental Hygiene Society at its recent annual meeting.

Dr. William Grossmann, Richmond, has resigned as head of the Bureau of Communicable Diseases of the State Health Department to take postgraduate studies at the University of Virginia.

Dr. Frederick B. Mandeville, formerly director of the Medical College of Virginia X-Ray Department, Richmond, who resigned last year to accept a position in Baltimore, Maryland, returned to his former position April 1.

Dr. John M. Huff, formerly of Chelsea, Massachusetts, has been appointed Superintendent of Public Health of Norfolk, a newly created separate department of public health which was set up March 15.

Dr. Albert L. Chapman, U. S. Public Health Service, has been Acting Commissioner of Health of Norfolk since the resignation of Dr. John C. Sleet, who retired the first of the year.

The Albemarle County Medical Society recently adopted a resolution to set aside a memorial floor in the proposed new University of Virginia Hospital building to honor local men and women who served in World War II.

Dr. George Allyn Chapman, Shenandoah Caverns, and Lieutenant Gladys Fulk were married recently.

Deaths

Dr. John James Board, Rustburg, aged 86, died recently of heart disease.

Dr. Henry Magruder DeJarnette, Fredericksburg, aged 72, died February 18.

Dr. Ashby Turner, Harrisonburg, aged 68, died recently.

Dr. Charles William Rodgers, Jr., Alexandria, aged 41, died recently of subarachnoid hemorrhage and bronchopneumonia.

Dr. Nathan W. Stollard, Dungannon, aged 83, died recently of cardiac failure.

Dr. Carl Clifford White, Mathews, aged 74, died February 3.

WEST VIRGINIA

A Victory Encampment of the Veterans of Foreign Wars, Department of West Virginia, will be held at Parkersburg, June 27-29.

Dr. Donald J. McNairy, U. S. Public Health Service, formerly of Norfolk, Virginia, has been assigned Medical Officer in Charge, Kanawha Valley Medical Center, South Charleston.

Dr. A. R. Sidel, Williamstown, has been appointed a member of the Council of the West Virginia State Medical Association, succeeding Dr. Curtis P. Artz, Grantsville, who resigned.

Dr. G. G. Irwin, Charleston, was elected Vice-President of the Mid-Atlantic section of the American Urological Association at its recent annual meeting.

Dr. E. R. Cooper, Troy, is on the staff of the Southwestern State Hospital, Marion, Virginia.

Dr. Hugh S. Edwards, formerly of Beckley, is on the staff of the State Sanitarium, Glencliff, New Hampshire.

Dr. Arthur J. Viehman, formerly of Huntington, is Assistant Superintendent, Julius Marks Sanitarium, Lexington, Kentucky.

Dr. J. O. Williams, Ameagle, has moved to Amigo.

Deaths

Dr. Henry Evans Baum, Charleston, aged 35, died March 10.

Dr. Alfred S. Black, Charleston, aged 83, died recently of pneumonia.

Dr. Henry Dickinson Causey, Fairmont, aged 64, died recently of heart disease.

Dr. Ossie Alexander Weatherly, Bluefield, aged 67, died recently of coronary thrombosis.

Dr. Charles Alphonse Wingerter, Wheeling, aged 79, died recently of cerebral thrombosis.

Dr. De Laniel L. Yost, Fairmont, aged 84, died recently.

Dr. Henry Sanford Yost, Fairmont, aged 77, died February 7 following a paralytic stroke.

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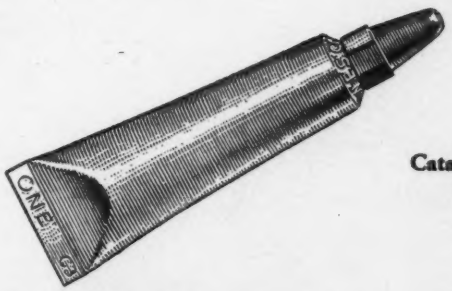

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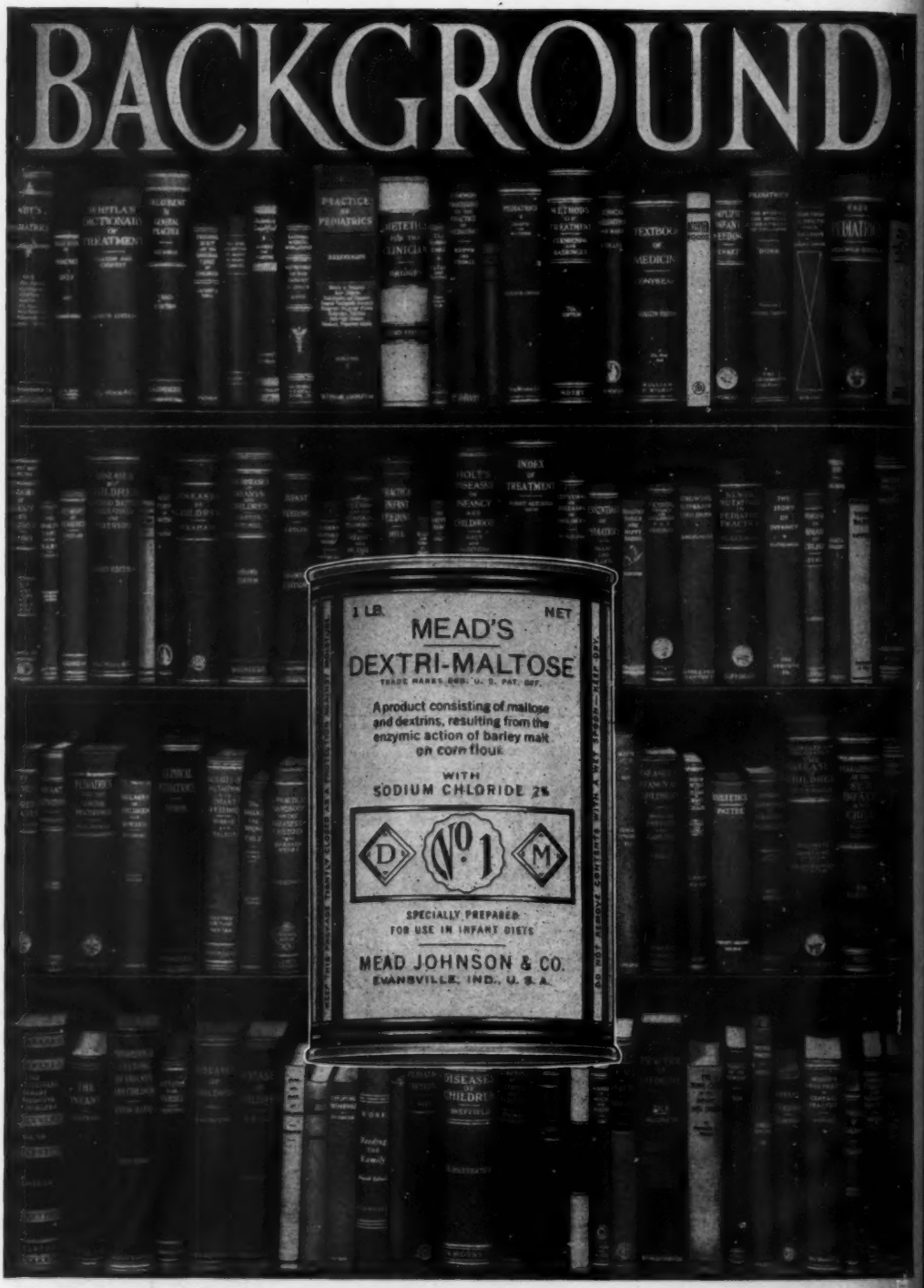

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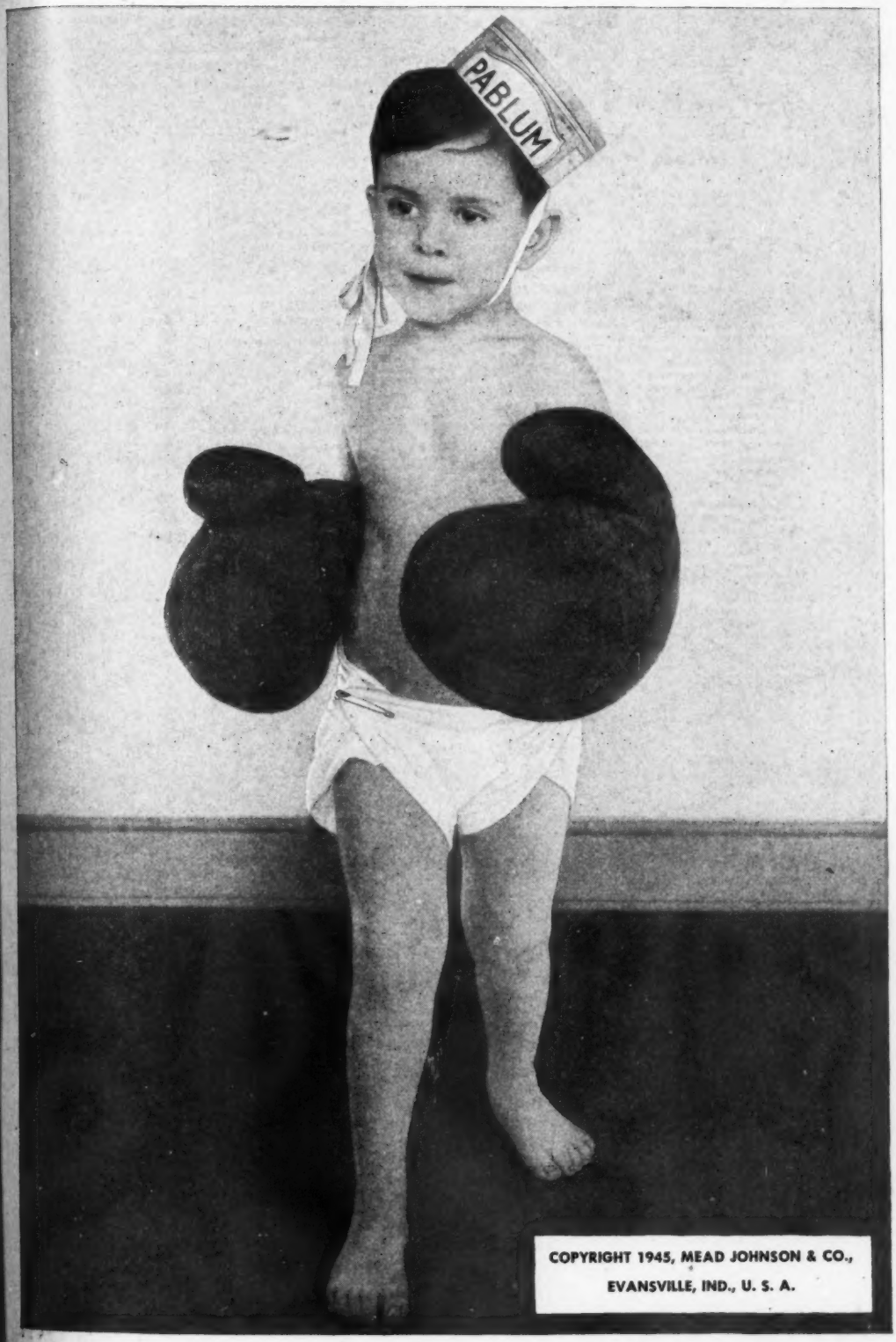

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